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AMERICAN AND OTHER PATENTED INVENTIONS.

DECEMBER, 1833.

Experiments made on the Navigation of the Chesapeake and Delaware Canal by Steam, reported by A. D. Bache, *Professor of Natural Philosophy and Chemistry in the University of Pennsylvania.*

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

The great importance of applying steam to navigation upon canals, has not failed to strike those interested in that mode of internal communication. It has been denied that steam navigation is possible in canals, when injury to the banks is not guarded against by expensive precautions; and that it can be advantageously applied in any case is still doubted, notwithstanding the attempt in Great Britain which is reported to have been successful. The result of experiments made on the Chesapeake and Delaware canal, seem to me to go far to remove, entirely, such doubts in relation to the larger class of canals; and with this impression I have supposed that a report of them might prove interesting.

In the experiments of which I am about to give an account, I assisted, without directing; all that is set down as coming from myself was obtained by careful observation, and when the information has been received from others, the authorities upon which it rests are also given. I engaged in these experiments with a view to their bearing upon an interesting inquiry in practical science, and the materials

are so laid before the reader that he may have a test of the accuracy of the observations, and of the conclusions which may be drawn from them.

A canal boat which had originally plied upon the Schuylkill, and been noted as a quick boat, was altered, under the direction of the President of the Chesapeake and Delaware Canal Company, (Robt. M. Lewis, Esq.) so as to increase the length, and to give greater sharpness to the bow, as well as to reduce the bottom to a regular and gently swelling curved surface, from the stem and stern, without any internal flexures. The length of the boat was thus made eighty feet, the length of the false bow, in the direction of the axis of the boat, being seven and a half feet; the width of the boat was ten feet; the draught, when light, twelve inches, and with a load of forty tons, fourteen inches, exclusive of the keel. The alterations were made under the direction of Mr. James Rush, of the firm of Rush & Muhlenburgh, and the engine, paddle wheels, &c. put in under his charge; from him I obtained the details just given, and those which follow, in relation to the boat and engine.

The engine was the result of an exchange, which enabled the experiment to be made with economy; it proved, however, to be much too small for the purposes in view. The diameter of the cylinder was eight and a half inches, and the length of stroke two and a half feet, the pressure of the steam with which it was supplied was about 140 lbs.; 150 lbs. to the square inch, on the safety valve, being the maximum pressure. The steam was cut off at half stroke and the escape steam served to heat, in part, the water which was thrown into the boiler. The nominal power of the engine was ten horses; but with a mean effective pressure, during the stroke, of 80 lbs. per square inch, an estimate probably not far from the truth if the pressure within the boiler was correctly stated, and supposing thirty-five double strokes to be made in a minute, the power would be more than double the nominal amount. The boiler was a vertical cylinder, six feet in length, and three feet in interior diameter, containing one hundrrd and twenty draught tubes from an inch and a half to two inches in diameter, and thirty inches in length, the tubes uniting above in a wide chimney. It appeared by the experiments that this boiler was competent to keep up a supply of steam for about thirty-five double strokes of the engine per minute. The paddle wheels were placed at the sides of the boat, and between one-third and one-half of the length of the boat from the bow; the wheels were eight feet two inches in exterior diameter, and four and a half feet wide; the buckets were six inches deep, and made of cast iron. The weight of the boiler was stated to be 2214 lbs., and of the wheels about one ton.

The preliminary trials with the boat were made on the river Schuylkill; upon them, as they were not made in the precise circumstances in which the boat would have to work in the canal, not much stress was to be laid; they were so far satisfactory, however, as to speed, and to the slight apparent swell produced by the boat at the highest speed of which the engine was capable, as to induce the President of the Canal Company to have the boat sent to the Chesapeake and

Delaware canal for further trial. A summary of the results obtained in a trip from the upper ferry to Gray's ferry, and back again, and in several short trips from near the middle ferry to near Gray's ferry, is given below. The averages being deduced from different numbers of experiments are not entirely comparable, but are probably as close approximations as the nature of the other data will furnish; the distances were measured from Allen's map of Philadelphia, and having been thus obtained can only be considered as approximations.

The tide was running down, and near the last of the ebb, the wind was from the S. E., and therefore, in part, favourable in those trips in which the tide was adverse.

Greatest speed down stream,	8.45 miles per hour.			
Least do. do.	6.50	do.	Steam stopped off to pass under the middle ferry bridge.	
Greatest speed up stream	7.35 miles per hour.			
Least do. do.	6.50	do.		
Average speed down stream	7.37	do.	} Mean 7.12 miles	
Do. up stream	6.88	do.	} per hour.	
Greatest number of revolutions of paddle wheels per minute				39
Least do.	do.	do.		30
Average do.	do.	do.		33¼
Average ratio of the velocity of the boat to the velocity of the circumference of the paddle wheel - - -				73 to 100

I have thought it best to give these conclusions, since they are sufficiently correct to afford a tolerable comparison with the inferences from similar experiments on the canal, and thus to enable the results for a stream to be compared with those in the comparatively narrow and shallow canal.

In the experiments on the Chesapeake and Delaware canal, circumstances were much more favourable to accuracy, and greater interest attaching to the observations, greater pains were taken to insure it. The marks upon the tow path were referred to as affording points at known, or easily ascertained, distances apart, and by a subsequent comparison of these with the corresponding measures in the channel of the canal, as afforded by the survey of the work, where it is not straight, the true distances were found. The time being observed by myself, with a watch with a seconds hand, was recorded by a friend who entered upon the notes any other observations which it was deemed necessary to preserve. In these experiments, although pains were taken to ascertain the speed of the boat and the capabilities of the engine, yet the main interest attached to the observation of the disturbance produced upon the banks at different degrees of speed, and to determining the effect of the figure of the boat, and the combined action of the boat and of the wheels, upon the water; the power of the engine could easily be increased within reasonable limits, provided the effect was not such, with the less power, as to produce a very great wash of the banks. To any one who has witnessed the labour

with which the rapid travelling upon this canal in barges towed by horses is accomplished, and the violent effects upon the banks produced by the great swell raised, a desire to substitute some less painful and less destructive method of navigation can hardly fail to occur.

The circumstances under which the steam-boat was to be tried were three in number; first, its use as a means of towing light barges for passengers; second, as a means of towing heavy boats of burthen; third, the comparative effect of using the boat alone, as to speed, as to injury to the banks of the canal, &c.

In the annexed statement, six columns are devoted to the record of experiments, and to the results of calculations; the first column gives the points at which the observations were made; the second, third, and fourth, the time of observation; the fifth, the number of revolutions of the paddle wheel per minute; and the sixth, general remarks. In the seventh column are the breadths of the canal at the several points of observation; in the eighth, the actual distances gone over, obtained as already described; in the eighth and ninth the time occupied in passing over the distances; in the tenth the rate of travel per hour, and in the eleventh the relative velocity of the boat to that of the periphery of the wheel, the velocity of the latter being taken as unity. The actual depths of the sheet of water at the several points of observation, to correspond with the breadths given in the seventh column, would have been interesting, but have not been taken in any surveys of the canal yet made. The widths of the canal are approximations, only; they were taken from a map of the survey of the canal.

Journal of the Experiments on the Navigation of the Chesapeake and Delaware Canal by the Steam-boat Lewis, September 22nd, 1833.

FIRST EXPERIMENT.

The steam-boat towing one of the barges, for passengers, used upon the canal.

Length of barge 90 feet, breadth of beam 19 feet, draught, when light 23 inches, including the keel, which is 11 inches; draught with the ordinary number of passengers 33 inches.* Awning of the barge up.

The barge 15 feet in rear of the steam-boat.

Twenty-eight persons in the steam-boat; seven in the barge.

* Reported by Mr. T. Craven.

Points at which the observations were made.	Time of passing the points.			No. of revolutions.	Remarks.	Width of water way.	Distance between stations	Time between stations		Rate per hour.	Ratio of velocity of boat to velocity of wheel.
	Hrs.	Min.	Sec.		Barge in tow.	Yds.	Yds.	Min.	Sec.	Miles	
Post 300 yds. east of Delaware bridge	8	14	45	37½	Wind strong in favour.	26 2-3					
Middle of Delaware bridge	„	16	35	—	Steam shut off, in part, 30 seconds in order to pass the bridge.		302				
Post 300 yds. west of Delaware bridge	„	18	22	36		56	302				
Mile post No. 1.	„	20	30	34½		59	385	2	08	6.16	.61
About the half mile				36							
Mile post No. 2.	„	30	40	—	1 Min. 30 seconds lost.	26 2-3	1770	8	40	6.96	.65
					Mean,					6.56	.63
					Return trip, with barge.						
Mile post No. 2.	8	40	38	39	Wind brisk,—adverse.	26 2-3					
				35½	Wind on bow for about half a mile,						
				31½	and directly ahead the other half.						
Mile post No. 1.	„	53	00	31½	Close to bank, *no wash*.	59	1770	12	22	4.88	.48
Post 300 yds. west of Delaware bridge	„	56	05	33	30 feet from bank.	56	385	3	05	4.26	.44
Middle of Delaware bridge	„	58	32	—	Steam, in part, shut off for 20 seconds.		302	2	27		
Post 300 yds. east of Delaware bridge	9	00	57	31½		26 2-3	302	2	25		
Post 300 yds. west of Delaware lock	„	04	20	33		26 2-3	471	3	23	4.74	.49
					Mean,					4.63	.47

Mean rate of boats. wind in favour 6.56 miles. } Relative rates.
" " adverse 4.63 " } 1.417 to 1.

Mean, . . 5.59

Greatest rate of boats, wind in favour 6.96 miles. } Relative rates.
" " adverse 4.88 " } 1.426 to 1.

Mean ratio of veloc. of boat to veloc. of wheel, wind in favour, .63
" " " " adverse, .47

Mean, ...55

SECOND EXPERIMENT.

The steam-boat, with thirteen persons on board.

Points at which the observations were made.	Time of observation. H.	M.	S.	No. of revolutions per minute.	Remarks. Steam-boat alone.	Width of water way. Yds.	Distance between stations Yds.	Timebetween stations. M.	S.	Rate of boat. Miles	Ratio of velocity of boat to velocity of wheel.
Post 300 yds. W. of Del. lock	9	12	35	39	Wind as in 1st. exp't.						
Post 300 yds. E. of Del. bridge	"	14	35	39	Faster than boat, and in favour.	26 2-3	471	2	00	8.03	.71
Middle of Delaware bridge	"	16	00	—	Steam shut off, in part, for 20 seconds.	26 2-3	302	—	—		
Post 300 yds. W. of Del. bridge	"	17	32	37½	More wash than in first exp't. but still harmless	56	302	—	—		
Mile post No. 1.	"	19	20	37½		59	385	1	48	7.29	.67
" No. 2.	"	26	30	39		59	1770	7	10	8.42	.77
" No. 3.	"	34	09	37½		55	1768	7	39	7.88	.72
" No. 4.	"	41	50	37½		176	1755	7	41	7.79	.71
Post 300 yds. E. of Penn. lock	"	43	30		Pass Pennsylvania lock.	44	—	1	40		
Post 300 yds. W. of Penn. lock	"	58	08		Wind slower than boat. Swell in front of boat just at a point opposite the bow was measured upon a stick, and found to be about 1 inch. Canal 9 to 10 ft. deep; pond 800 ft. wide. Exp't. not precise.	275		15	22		
Mile post No. 5.	10	00	30	39		190		2	42		
" No. 6.	"	08	13	37½		132	1764	7	23	8.14	.73

SECOND EXPERIMENT, *Continued.*

After passing mile post No. 6 a sloop was attached by tow lines to the steam-boat; the burthen of the sloop was forty-four tons, the actual loads being fifty tons of anthracite, and the draught sixty-two inches exclusive of the keel. The helmsman of both the steam-boat and the sloop, not understanding the management of their respective vessels, in the new circumstances in which they were placed, there was so much sheering in one direction and another, that it was deemed expedient to cast off the tow lines on the approach of the pssenger barge which appeared in sight. The speed was estimated differently at from three to four miles per hour, but the checks which it constantly met with rendered any accuracy of estimate out of the question. The passenger barge, towed by *eleven* horses, now passed, and the steam-boat followed; part of the experiment, which follows, was made in the shallower end of a former mill-pond, and the other through about one quarter of a mile of the deep cut.

Points at which the observations were made.	Time of observation. H.	M.	S.	No. of revolutions per minute.	Remarks. Steam-boat alone.	Width of water way. Yds.	Distance between stations. Yds.	Time between stations. M	S.	Rate of boat. Miles	Ratio of velocity of boat to velocity of wheel.
Mile post No. 7.	10	34	52	37	From the bottom of the depression to the top of the swell created by the barge, was, at the lowest, three and a half feet; the same height for the swell of the boat was one foot at the most. (In deep cut.) Mean,	210					
Mile post No. 8.	"	42	57	36		26	2-3 1756	8	05	7.41	.70
										7.85	.71

SECOND EXPERIMENT, *Continued.*

Points at which the observations were made.	Time of observation. H.	M.	S.	No. of revolutions per minute.	Remarks. Return trip with steamboat alone.	Width of water way. Yds.	Distance between stations Yds.	Time between stations. M.	S.	Rate of boat. Miles	Ratio of velocity of boat to velocity of wheel.
Mile post No. 7	11	23	30	38	Light wind ahead.	270					
				37½							
Mile post No. 6		31	42	36		132	1769	8	12	7.36	.70
				35							
Mile post No. 5		39	53	37½	Wind strengthens.	190	1764	8	11	7.35	.68
Post 300 yds. W. of Penn. lock		43	52	37½		275	—	3	59		
Pennsylvania lock		50	20	—	In lock, and going 300 yds.			6	28		
Post 307 yds. E. of Penn. lock		52	18	33		44	—	1	58		
Mile post No. 4		54	10	34½		176	—	1	52		
				34½							
Mile post No. 3	12	02	20	—		55	1755	8	10	7.33	.73
				35							
Mile post No. 2		10	18	35½		59	1768	7	58	7.56	.74
				34½							
Mile post No. 1		17	55	—		59	1770	7	35	7.92	.77
Post 300 yds. W. of Del. bridge		19	40	—		56	385	1	45	7.50	
Middle of Delaware bridge		21	05	—	Steam slack.	26 2–3	302	1	24		
Post 300 yds. E. of Del. bridge		22	57	34½		26 2–3	302	1	52		
Post 300 yds. W. of Del. lock		25	15	33		—	471	2	18	6.98	.70
					Mean,					7.43	.72

Mean velocity of steam-boat, wind in favour 7.85 miles per hour. } Relative rates.
" " adverse 7.43 " } 1.055 to 1.

Mean, 7.64

Greatest vel. of steam-boat, wind in favour 8.42 " } Relative rates.
" " adverse 7.92 " } 1.068 to 1.

Mean ratio of velocity of boat to velocity of wheel, wind in favour, .71
" " " " " adverse, .72

THIRD EXPERIMENT.

Steam-boat towing a freight barge of twenty-five tons burthen, loaded with from fifteen to eighteen tons of merchandise, and drawing two and a half feet of water.

Wind very light, in favour of the boat.

Points at which the observations were made.	Time of observation. H.	M.	S.	No. of revolutions of wheels, per minute.	Remarks.	Width of water way. Yds.	Distance between stations. Yds.	Time between stations. M.	S.	Rate of boat. Miles per hour.	Ratio of velocity of boat to velocity of wheels.
Post 300 yds. W. of Delaware lock.	12	40	34	34	Towing a freight barge.						
Post 300 yds. E. of Delaware bridge.		43	31	34	Steam slacked for 30 seconds.	26 2–3	471	2	57	5.44	.55
Middle of Delaware bridge.		45	25			26 2–3					
Post 800 yds. W. of Delaware bridge.		47	18	34½		56					
Mile post No. 1.		49	22	35		59	385	2	04	6.36	.62
					Mean,					5.95	.58

The passenger barge from the west appearing in sight, the freight barge was disengaged, and the boat put about. At the first part of this experiment there was a difficulty encountered similar to that noticed in the case of the attempt to tow the sloop, but less in degree; it resulted from the inexperience of the helmsman of the barge, and as soon as he had been directed how to steer, and followed the directions, there was no further trouble from this source.

FOURTH EXPERIMENT.

Steam-boat alone, returning in rear of the passenger barge drawn by seven horses.

Light wind ahead.

Points at which the observations were made.	Time of observations. H.	M.	S.	No. of revolutions of wheels, per minute.	Remarks.	Width of water way. Yds.	Distance between stations. Yds.	Time between stations. M.	S.	Rate of boat. Miles per hour	Ratio of velocity of boat to velocity of wheel.
Mile post No. 1.	12	58	45		Steam-boat alone.	59					
Post 300 yds. W. of Delaware bridge.	1	00	40			56	385	1	55	6.84	
Delaware bridge.		02	00			26 2–3	302	1	20	7.74	
Post 300 yds. E. of Delaware bridge.		03	32			26 2–3	302	1	32	6.63	

The barge had seven horses, which of course were fatigued, for which circumstance allowance must be made; there was, however, no point of time in which the steam-boat could not have passed the barge after it had come up to it and, in fact, during part of the last 300 yards, and after passing the 300 yards post the steam was slackened occasionally, to keep from running too close to the barge.

Summary of the Average Results.

Mean velocity.	Miles per hour.	Mean ratio of veloc. of boat to velocity of wheel.	Remarks.	Average No. of revolutions per minute.
Steam boat alone, . .	7.64	.71	A mile in 7 min. and 7-8ths.	36·9
With passenger barge in tow,	5.59	.55		34.7
With freight barge in tow	5 95	.58	No exp'ts. against the wind.	35.1

In these experiments, at the highest rate of motion obtained, there was no swell produced in the straight parts of the canal, which would have been likely to injure the banks although not specially protected. The wave from the bow of the boat, owing to the peculiar form of that part, fell in with the wheels, and was disposed of by them; while the lean form of the stern brought together the waves produced by the wheels, which, therefore, spread very little, if at all, in a lateral direction, that is, towards the banks, being directed towards the tow-path only in parts of the curved portions of the canal. When the barge was in tow, and with the more rapid rate then assumed, nearly seven miles per hour, there was no perceptible swell behind the barge, the swell from the wheels not appearing after meeting the bow of the barge. There was no obvious change in the character of the swell at low and high velocities, but the experiments did not permit numerical accuracy upon this point.

At the time when the heights of the wave from the barge and from the steam-boat are noted in the remarks, the barge was so far before the boat that the latter was free from any effect produced by the swell of the former. It was in the deep cut, and the bow of the barge was elevated, and the stern depressed, mounting an inclined plane, while, besides the wave which preceded the bow, a destructive surge followed sweeping above the stoning of the banks of the tow-path. The wave from the steam-boat was included within limits comprising only a portion of the cover of the banks, and did not break with the violence necessary to carry away the soil and pebbles from behind the stones.

The boat suffered no sensible retardation in passing into the deep cut, for, in the latter part of the second experiment, with thirty-six and thirty-seven revolutions, the speed was about seven and a half miles per hour, while in the wider portions, with thirty-seven and a half, the speed was about seven miles and three-quarters. The same conclusion is to be drawn by comparing these results with those obtained in the Schuylkill; in fact, the average speed with a given number of revolutions upon the canal, rather exceeds that with the same number upon the river.

The want in power of the engine prevented the experiments from being conclusive in relation to towing, with high rates of motion, though they seem to indicate greater advantages from towing, at rapid rates, than in moving with the boat alone. That the speeds attained by even this imperfect model, compare with those which

the labour of eight horses is capable of producing, appears by the annexed memorandum received from the captain of one of the passenger barges which passes daily through the canal on the line from Philadelphia to Baltimore.

		Minutes.	Seconds.		Rate per hour in miles.
" From the 11th to the	10th mile post,	9	40		6.02
10	9	10	00		6.00
9	8	9	00		6.67
8	7	8	40		6.92
7	6	7	55		7.58
6	5	7	20		8.18
5	4	13	50	Includes lockage.	
4	3	8	38		7.02
3	2	8	20		7.20
2	1	7	20		8.18
1	0	8	58		6.69

The average speed is about nine minutes to the mile, and two hours are required to pass the canal."

While then it would seem to be an easy matter to exceed the average speed which is attainable in towing by horses, the swell produced by one and by the other mode of conveyance are not comparable with each other.

A review of the experiments leads me to the conclusion indicated in the commencement of this article, namely, that steam power may be substituted for the present method of towing by horses on large canals, with great advantage to the canal, particularly at high velocities.

There was no opportunity on this occasion to examine into the cost of this mode of transportation, by ascertaining the amount of fuel consumed in the different trips; this point was investigated, and a further trial in towing heavy vessels was made by Caleb Newbold, Esq. As the results will serve to render my statements more full, I subjoin them.

	Hrs.	Mins.	Rate. Miles per hour.
" 1st. expt., steam-boat alone, St. Georges to Delaware City (4.25 miles)	0	33	7.73
2nd. expt., steam-boat alone, Delaware City to Chesapeake,	1	55	6.91
3d. expt., steam-boat alone, Chesapeake and Delaware city,	1	50	7.23

" In both of the last experiments the steam was slackened off repeatedly to accommodate vessels; the time given is exclusive of six

minutes for lockage. The most rapid rates of motion were one mile in six minutes and twenty seconds, (9.48 miles per hour,) and one mile in six minutes and thirty seconds, (9.23 miles per hour.) The greatest number of revolutions made in one minute by the wheels was forty-two. 575 lbs. *of pine wood*, of fair good quality, (about one-fifth of a cord,) were consumed in keeping up the steam for one hour and fifty minutes.

"4th. experiment, Delaware City to St. Georges, towing the schooner William and George, of 45½ tons burthen, empty, fifty-six minutes, (rate 4.5 miles per hour.)

"5th. experiment, St. Georges to Delaware City, towing the sloop Martha and Elizabeth, of 39 tons, clump built, heavy laden, drawing six feet of water, one hour and two minutes, (rate 4.1 miles per hour.) Part of the way there was a fair wind, and part of the way a strong side wind, which, owing to the want of keel of the steam-boat, pressed it somewhat on the tow path. The vessel is one of the heaviest *towers* of her class. No difficulty in steering, nor any embarrassment from *sheering*."

Prize medals to be awarded, for discoveries in Science, by the Royal Society of London.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—I am directed by the American Philosophical Society to communicate to you, for publication, the annexed letter, received at their last stated meeting. The object of the Society is to diffuse the information given in that letter throughout the scientific community in the United States.

Very respectfully, yours,
A. D. BACHE,
One of the Secretaries, Am. Philos. Soc.

Somerset House, Apartments of the Royal Society, London, August 3d, 1833.

SIR,—I am honoured with the commands of his Royal Highness the President of the Royal Society, to acquaint you, for the information of the American Philosophical Society, at Philadelphia, that his Majesty, the King, has been pleased to grant two gold medals of the value of £50 each, to be awarded by the Royal Society on the day of their anniversary meeting in each succeding year, for the most important discoveries in any one principal branch of physical and mathematical knowledge.

His Majesty having graciously expressed a wish, that scientific men of all nations should be invited to afford the aid of their talents and researches, I am accordingly commanded by his Royal Highness the President to announce to you, sir, that the said Royal Medals for 1836, will be awarded in that year; the one for the most important unpublished paper on Astronomy, the other for the most important

unpublished paper in Animal Physiology, which may have been communicated to the Royal Society for insertion in their Transactions, after the present date, and prior to the month of June in the year 1836.

For the present, and the two following years, the Council of the Royal Society, with the approbation of his Majesty the King, have directed the Royal Medals to be awarded for important discoveries or series of investigations published within three years previous to the time of award; and those for the year 1833, have been adjudged, the one to Sir John F. W. Herschel, for his paper on the investigation of the Orbits of Revolving Double Stars, inserted in the fifth volume of the memoirs of the Royal Astronomical Society; the other to Professor Decandolle for his investigations in Vegetable Physiology, as detailed in his work entitled Physiologie Végétale.

I have the honour to be, Sir,
Your most obedient servant,
CHARLES CUNIG, *For. Sec. Roy. Soc.*

To the Secretary of the American
Philosophical Society, Philadelphia.

PATENT CAUSE.

Decision of the Supreme Court of the United States, on the effect of delaying to obtain a patent after an invention is completed; in the case of JOSHUA SHAW *versus* JOSEPH COOPER, *in January Term*, 1833.

Under a similar title we published the decision in the case of Pennock and Sellers *v.* Dialogue, at p. 184 of vol. iii, and we are indebted to the same friendly hand which furnished the materials of that report, for the aid which has led to the publication of the subjoined article. There are but few points of equal importance to real inventors with that of a correct understanding of what constitutes an abandonment of their rights, a question which had never been definitively settled in the decisions of our courts until that made in the case above alluded to. The principles there laid down are, in the present case, not merely confirmed, but extended, and their application more clearly shown. In England the utmost secrecy is requisite until a patent has been actually obtained, and although such is not the case in this country, the patent laws being in both founded upon the same principles, it follows that there must be an accordance in the practice under them, although, as in many other instances, our decisions are less influenced by mere technicalities than those of the English courts. There, a true and original inventor, although he may use all due diligence in applying for a patent, may be deprived of his right by the villany of a workman, or the indiscretion of a friend, to whom he has, from necessity, or in confidence, made known his invention; here, according to the most strict construction of the decisions in Sellers and Pen-

nock *v.* Dialogue, and in that which follows, it can be lost only by the actual negligence and wilfulness of the inventor himself.

Joshua Shaw obtained a patent dated 19th June, 1822, for "a new and useful improvement in guns and fire arms, which improvement consisted in a priming head and case applied to guns and fire arms, for the purpose of priming and giving them fire by the means or use of percussion, fulminating, or detonating, powder:" which patent was surrendered on account of defects in the specification, and a new one issued, under an amended one, on the 7th of May, 1829, for the residue of the term of fourteen years from the first date. At the October term of 1829, Joshua Shaw instituted a suit against Joseph Cooper, for an alleged violation of his patent; the amended specification being put in by the plaintiff as the true description of his invention.

The points upon which the defendant relied were, that the pretended improvements were not made by Shaw; that they had been known and used in the United States, and in England, France, and other foreign countries, before the alleged discovery of them by him; that the essential parts of them was the invention of some person in England; that the patent was void because there was no discrimination between those parts which were new, and those which were old; and because the invention was not described in such full, clear, and exact terms, as are required by law, and because it was obtained surreptitiously.

The cause was tried in January, 1832, and a verdict and judgment given for the defendant.

On the trial in the Circuit Court, the plaintiff adduced testimony to prove that he had made the invention or discovery in 1813 or1814; that not being himself a worker in iron, he, in 1813 or 1814, employed his brother, in England, under injunctions of secrecy, to make the apparatus necessary for experimenting with; that he left England in 1817, to reside in the United States, soon after which, his brother divulged the secret, for a reward, to a gunmaker in London; that he, the plaintiff, treated the invention as a secret after his arrival in this country, and that it was never publicly known here until after the date of his patent of the 19th June, 1822. Testimony was adduced to show that the principal importers of fire arms in New York and Philadelphia, had not heard of the thing at the time of the date of the patent, and that no guns of the kind were imported until the year 1824 or 1825. That letters patent were granted in England on the 11th of April, 1807, to one Alexander J. Forsyth, for a method of discharging fire arms by the use of a priming of percussion powder, merely by a blow; and it was contended that the existence of this patent to Forsyth, which gave to him the exclusive right to use the percussion powders in any mode, down to April, 1821, accounted for the plaintiff not taking out a patent in England; and that up to the time of his obtaining his patent here, he was engaged in experiments for the purpose of perfecting his invention.

The defendant proved by the testimony of one witness that he had used the improvement in England, had purchased a gun of the kind there, had seen others use them, and had seen guns of the kind in

the Duke of York's Armory in 1819; it was also proved by five other witnesses who had worked at the business of making guns, in England, in 1820 and 1821, that it was in general use there in those years, but they had never seen such at an earlier date; that in 1821 it was generally known and used in France; and in the United States after the 19th of June, 1822.

The foregoing contains the main points in the bill of exceptions; the case was submitted to the Supreme Court on printed arguments, by Mr. Paine on the part of the plaintiff, and Mr. Emmet for the defendant. We do not think it necessary, in our summary, to notice some of the points introduced by the counsel, as not bearing upon the question of the originality and novelty of the invention, but principally upon the fact of the plaintiff having been an alien at the time of his obtaining his patent in the first instance.

On the part of the plaintiff's counsel it was contended that the alleged public use was not such as to invalidate the claim of the patentee; that there were stronger instances of public use in the reported cases, in which patents had, nevertheless, been sustained, the inventor not having been considered as thereby abandoning his claim to the public; that at the time of taking out the patent, the invention had never been heard of here; that it had been known and used in England only two years, which was a foreign use, and would not have been an extraordinary one had it existed here; that the public here could sustain no injury by the existence of the exclusive right, they never having been in possession of the invention; that if an invention has been pirated, or fraudulently divulged, the inventor does not thereby lose his right, unless he acquiesce in the public use of it to such an extent as to prove by his neglect, that he has abandoned it to the public, and that in this case there was no evidence of such neglect; that the delay was accounted for by the plaintiff being engaged in the attempt to improve his invention; and that his not obtaining a patent in England resulted from the existence of Forsyth's patent there.

For the defendant it was contended that the public had, *somehow*, become fully possessed of the invention for two years before the plaintiff took any steps to secure a patent; that there was evidently both *negligence and unreasonable delay*, which was not invalidated by the pretence that the plaintiff was *maturing* his invention; as he at last took his patent for the very thing which had been in use for two or three years previously, both in England and France; that the delay was unnecessary, and amounted to an abandonment of his invention; that the thing being new here was not sufficient, as the settled law is that it must be *new to the world*.

The opinion of the Supreme Court was delivered by Mr. Justice M'Lean, which after a recital of the general facts of the case, and the citation of the legal authorities which bear upon it, concludes in the following terms:—

The patent law was designed for the public benefit, as well as for the benefit of inventors. For a valuable invention, the public, on the inventor's complying with certain conditions, give him, for a limited

period, the profits arising from the sale of the thing invented. This holds out an inducement for the exercise of genius and skill in making discoveries which may be useful to society, and profitable to the discoverer. But it was not the intention of this law, to take from the public, that of which they were fairly in possession.

"In the progress of society, the range of discoveries in the mechanic arts, in science, and in all things which promote the public convenience, will be enlarged. This results from the aggregation of mind, and the diversity of talents and pursuits, which exist in every intelligent community. And it would be extremely impolitic to retard or embarrass this advance, by withdrawing from the public any useful invention or art, and making it a subject of private monopoly. Against this consequence, the legislature have carefully guarded in the laws they have passed on the subject.

"It is undoubtedly just that every discoverer should realize the benefits resulting from his discovery, for the period contemplated by law. But these can only be secured by a substantial compliance with every legal requisite. His exclusive right does not rest upon his discovery alone; but also upon the legal sanctions which have been given to it, and the forms of law with which it has been clothed.

"No matter by what means an invention may be communicated to the public, before a patent is obtained; any acquiescence in the public use, by the inventor, will be an abandonment of his right. If the right were asserted by him who fraudulently obtained it, perhaps no lapse of time could give it validity, but the public stand in an entirely different relation to the inventor.

"The invention passes into the possession of innocent persons, who have no knowledge of the fraud, and at a considerable expense, perhaps, they appropriate it to their own use. The inventor, or his agent, has full knowledge of these facts, but fails to assert his right: shall he afterwards be permitted to assert it with effect? Is not this such evidence of acquiescence in the public use, on his part, as justly forfeits his right?

"If an individual witness a sale and transfer of real estate, under certain circumstances, in which he has an equitable lien or interest, and does not make known this interest, he shall not afterwards be permitted to assert it. On this principle it is that a discoverer abandons his right, if, before the obtainment of his patent, his discovery goes into public use. His right would be secured by giving public notice that he was the inventor of the thing used, and that he should apply for a patent. Does this impose any thing more than reasonable diligence on the inventor? And would any thing short of this, be just to the public?

"The acquiescence of an inventor in the public use of his invention, can in no case be presumed, where he has no knowledge of such use. But this knowledge may be presumed from the circumstances of the case. This will, in general, be a fact for the jury. And if the inventor do not, immediately after this notice, assert his right, it is such evidence of acquiescence in the public use, as for ever afterwards to prevent him from asserting it. After his right shall be

perfected by a patent, no presumption arises against it from a subsequent use by the public.

"When an inventor applies to the Department of State for a patent, he should state the facts truly; and indeed he is required to do so, under the solemn obligations of an oath. If his invention has been carried into public use by fraud, but for a series of months or years he has taken no steps to assert his right, would not this afford such evidence of acquiescence as to defeat his application, as effectually, as if he failed to state that he was the original inventor? And the same evidence which should defeat his application for a patent, would, at any subsequent period, be fatal to his right. The evidence he exhibits to the Department of State is not only ex parte, but interested; and the questions of fact are left open, to be controverted by any one who shall think proper to contest the right under the patent.

"A strict construction of the act, as it regards the public use of an invention, before it is patented, is not only required by its letter and spirit, but also by sound policy. A term of fourteen years was deemed sufficient for the enjoyment of an exclusive right of an invention by the inventor; but if he may delay an application for his patent at pleasure, although his invention be carried into public use, he may extend the period beyond what the law intended to give him. A pretence of fraud would afford no adequate security to the public in this respect, as artifice might be used to cover the transaction. The doctrine of presumed acquiescence, where the public use is known, or might be known, to the inventor, is the only safe rule which can be adopted on this subject.

"In the case under consideration, it appears the plaintiff came to this country, from England, in the year 1817, and being an alien, he could not apply for a patent until he had remained in the country two years. There was no legal obstruction to his obtaining a patent in the year 1819; but it seems that he failed to apply for one until three years after he might have done so. Had he used proper diligence in this respect his right might have been secured, as his invention was not sold in England until the year 1819. But in the two following years, it is proved to have been in public use there, and in the latter year, also in France.

"Under such circumstances, can the plaintiff's right be sustained?

"His counsel assigns as a reason for not making an earlier application, that he was endeavouring to make his invention more perfect; but it seems, by this delay, he was not enabled, essentially, to vary or improve it. The plan is substantially the same as was carried into public use through the brother of the plaintiff in England. Such an excuse, therefore, cannot avail the plaintiff. For three years before the emanation of his patent, his invention was in public use, and he appears to have taken no step to assert his right. Indeed he sets up, as a part of his case, the patent to Forsyth, as a reason why he did not apply for a patent in England.

"The Forsyth patent was dated six years before. Some of the decisions of the Circuit Courts, which are referred to, were overruled in the case of Pennock and Sellers *v.* Dialogue, They made the ques-

tion of abandonment to turn upon the intention of the inventor. But such is not considered to be the true ground. Whatever may be the intention of the inventor, if he suffers his invention to go into public use, through any means whatsoever, without an immediate assertion of his right, he is not entitled to a patent; nor will a patent, obtained under such circumstances, protect his right.

"The judgment of the Circuit Court must be affirmed with costs."

Process for the extemporaneous evolution of Iodine. Communicated by ROBERT HARE, *M. D., Professor of Chemistry in the University of Pennsylvania.**

Heat to the temperature of ebullition nearly, about two ounces of concentrated sulphuric acid, in a glass globe like that represented in the following figure.

It is preferable to have the whole of the globe heated by suspending it, with due caution, over a large charcoal fire. Then quickly transferring it to the iron tripod, previously heated, and furnished with a small bed of hot sand, throw into the acid about half a drachm of iodide of potassium, or sodium, sometimes called hydriodate of potash or soda. Instantaneously the cavity of the globe will become replete with the splendid violet vapour of iodine, which will soon after condense on those portions of the glass which are first refrige-

* Originally published in the Journal of the College of Pharmacy.

rated, in crystals symmetrically arranged, of great beauty, and unusual size.

It is perhaps more convenient, as respects the manipulation, to have the globe suspended by a crane, like that used for the suspension of large kettles, rendering it easy, by a circular motion, to swing them on, or off, the fire. By similar management the globe may be first kept over the fire till sufficiently hot, and then swung off to receive the salt. A method more attainable in the small way, is that of placing the vessel employed in a small iron skillet, in which it may be made steady by sand. Thus prepared, it may in the first place be conveniently held over the fire, and afterwards transferred to a table, and supported without removing it from the skillet.

Improved apparatus for showing the Spontaneous Combustion of Phosphorus in Chlorine. By the author of the preceding article.

In my Compendium, I have given an engraving and description of an apparatus for the combustion of phosphorus in chlorine, so contrived as to prevent the odious fumes from reaching the spectators.

Subjoined, will be found another apparatus, constructed about three years since, by which the process is rendered still more manageable.

Suppose a cylindrical glass vessel, (see figure annexed,) eight or nine inches in diameter, and about a foot in height, with a neck about four inches high, and one and a half inches in bore; the whole resembling a large decanter without a bottom. About the orifice of the neck, let there be cemented, air tight, a brass cap, surmounted by a stuffing box, and having on one side a hole communicating with the cavity of the neck; this aperture must be furnished with a thumb screw, by which it may be opened or closed at pleasure. Through the stuffing box, a copper rod passes, at the lower end of which a glass, or leaden, stopple is so affixed as to close the lower part of the neck, into which it is ground to fit air tight. Over this stopple, a cup of copper is soldered, so as to be concentric with the rod. The rod terminates above in a handle. Within the cup, let ten or fifteen grains of phosphorus be placed. This is easily effected when the cup and plug are depressed into the lower part of the cavity of the vessel, by a suitable movement of the sliding rod. In the next place draw up the cup and plug into the neck so as nearly, but not entirely, to close the neck, and sink the vessel into the water of the pneumatic cistern until all the air below the neck is expelled through the hole in the side of it, which is then to be closed by means of the screw, and the plug twisted and drawn into its place so as to be air tight. After filling the body of the vessel thus, with water, place it upon the shelf of the cistern. Chlorine may now be allowed to occupy three-fourths of the space within the vessel below the plug. The process being so far advanced, it is only necessary, at the moment when it is desirable to produce the combustion, to depress the plug, and of course the cup associated with it, containing the phosphorus, into the cavity replete with the chlorine. The phosphorus soon burns actively, although with a feeble light.

The increased temperature consequent to the combustion, causes the gas to expand, but not so much as to become too bulky to be retained.

In this case, the chlorine forms a chloride of phosphorus, which meeting with water, is decomposed into phosphoric and muriatic acids. By transferring the vessel, after it is supplied with chlorine, to a clean porcelain, or glass, dish, covered by pure water, the products of this combustion might be saved, and would of course increase in proportion to the quantity of phosphorus and chlorine employed. On a larger scale this process might be resorted to advantageously for the production of phosphoric acid, which is produced when the proportion of chlorine is sufficient; say four cubic inches for every grain of phosphorus.

FRANKLIN INSTITUTE.

Minutes of the Quarterly Meeting.

The thirty-ninth quarterly meeting of the Institute was held at their Hall, October 17, 1833.

William H. Keating, was appointed Chairman, and

William Hamilton, Rec. Sec. pro tem.

The minutes of the last quarterly meeting were read and approved.

Donations of books were received from Messrs. Andrew M. Jones, Henry Troth, Edward Needles, and Robert H. Smith.

The Corresponding Secretary laid on the table the various journals which had been received in exchange for the Journal of the Institute during the last quarter.

The Chairman of the Board of Managers read the thirty-ninth quarterly report of the Board, which was accepted, and, on motion, referred to the committee on publications, with instructions to publish such parts as they may deem expedient.

The treasurers report for the quarter ending October 10th, was read and accepted.

Professor Johnston informed the Institute of the decease of Warren Colburn, Esq., of Lowell, Massachusetts, when, on motion, it was

Resolved, That having recently learned the decease of Warren Colburn, Esq., this Institute, in common with other friends of the useful arts, feel a deep sense of their bereavement, and cherish a cordial sympathy with the friends and relatives of the deceased.

Professor A. D. Bache, called the attention of the meeting to a manuscript work, presented to the Institute by Mr. Edward Needles, of this city, and containing a description of a very complete instrument, invented by the late Mr. John Needles, for mechanical solution of the various cases in plane trigonometry, for the protraction of surveys, and kindred purposes. The instrument is called by the inventor a "Mathematical Trigonometer." The book contains the commendation of the instrument by Professor Robert Patterson and Wm. Waring, dated in 1793.

Quarterly Report of the Board of Managers.

The Board of Managers respectfully submit to the Institute their report for the past quarter.

The summer quarter includes but a small portion of the active operations of the Institution, and the Board have therefore merely to give an account of the items of business left unfinished at the date of their last report. The exhibition of domestic manufactures at the close of the quarter forms an exception to these remarks; but a detailed report in relation to it cannot be presented until all the results are accurately ascertained. These results will be submitted in the next quarterly report. In the mean while, the Board must congratulate

their fellow members upon the success of the exhibition; the improvement in the articles manufactured, and the increased number and variety of the products, give evidence of new and successful exertions on the part of our manufacturers and artisans. The public of our city have cheered us not only by a continuance of their interest, but by a very considerable increase in attendance over that of former years. It is estimated that not less than 50,000 persons have visited the exhibition of this year. The committee, it will be recollected, have made arrangements by which an address by the Hon. Daniel Webster, of Massachusetts, will be delivered on the occasion of distributing the premiums awarded to the successful competitors at the exhibition.

The collections of the Maclurean Lyceum, which it was stated in the last report had been transferred to the Institute, have been placed under the charge of the appropriate committees. The committee on minerals having considerable duty to perform to arrange the specimens which have thus accrued to their department, has been increased by the addition of C. B. Mathews, M.D., and Mr. J. A. C. Trautwine.

The committee on weights and measures have begun their duties by considering the steps taken by foreign countries and by the United States in arranging their systems of weights and measures; the committee have now before them the reports from their members furnishing the necessary information.

The labours of the committee on explosions in the branch of their inquiry directed to ascertaining the strength of materials of which steam boilers are made, have been continued, and will soon, it is confidently expected, be brought to a close.

The department of instruction has been efficiently arranged by the committee having charge of it. The lectures on Chemistry and Natural Philosophy will begin in the last week of this month; the opening introductory lecture will be on the 29th inst. The committee hope to be able to supply to the members, the course left vacant by the absence from the country of the lecturer on practical mechanics; arrangements will also be made for supplying the evenings left open for volunteer lectures. The Board would again call the attention of the members to the subject of these lectures, and invite them to the communication of the results of their practice or of study.

The drawing school will be opened on the 23d inst. under the charge of Mr. William Mason. The well known abilities of this gentleman as a teacher warrant the selection of the committee, and the recommendation of the school by the Board to the members of the Institute, and to the public.

The evening English School is already opened, and the board take this opportunity to express their undiminished confidence in the plan of instruction there pursued.

The treasurer's report is herewith submitted.

Since the last report the following persons have become life members of the Institute, viz. Isaac Lea, Charles Toppan, Saml. Hufty, A. C. Peixotto, Henry Paul Beck.

Respectfully submitted.

WILLIAM HAMILTON, *Actuary.* A. D. BACHE, *Chairman.*

Fourth Monthly Conversation Meeting.

The Franklin Institute held their fourth monthly conversation meeting for this season at their Hall on the evening of Thursday, the 24th of October, at which Mr. Espy stated the result of experiments which had been made with a draught cap invented by him, and a model of which had been shown at a former meeting, upon the chimney of the furnace of the steam-boat pioneer, belonging to the Lehigh Navigation Company. The certificate of the captain and of the engineer of the boat, showed that for the same amount of work done the consumption of fuel had been diminished nearly one-fourth. This led to a discussion of the principles upon which an increase of effect might result from a less use of fuel when the draught was made more perfect.

One of the percussion locks, made under the direction of Captain Huger, of the U. S. Ordnance Corps, of which the drawings were exhibited at a former meeting, was placed upon the table for examination and trial.

Mr. Baldwin explained the movable diagrams of the locomotive engine constructed by him for the Philadelphia and Germantown railroad, showing the simplifications which he had made in the details of Stephenson.

A neat rotary pump for raising water, patented by Mr. P. Hubbard, of Vermont, was exhibited.

Report of the Committee on Premiums and Exhibitions of the Franklin Institute.

To the Board of Managers of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, the Committee on Premiums and Exhibitions respectfully report:—

That the eighth exhibition of American Manufactures was held at the Masonic Hall in this city, from the first to the fifth of October inclusive, during which time it was visited by a very large number of our fellow citizens. The receipts at the door of the rooms amounted to the sum of 1386 dollars and 26 cents, showing that upwards of eleven thousand persons paid for admission; if we add to this number the members of the Institute, the depositors of goods, and the persons permitted to be introduced by them, the whole number of visitors could not have been less than fifty thousand.

That our exhibitions continue to be highly appreciated by the public, is a source of satisfaction to the committee; but the most gratifying evidence afforded by this case, is the very general improvement in our manufactures, as asserted by the judges appointed to examine and report on the various articles in the collection. We have now afforded to us a striking proof that most of the articles of manufacture necessary to comfort, convenience, and even to luxury, can be produced by the skill and industry of our own artisans, affording a powerful addition to the means of independence possessed by our common country.

Strangers have frequently asked, when viewing the specimens submitted at our exhibitions, "are these of American manufacture?" evidently doubting the ability of the country to produce the articles before them, but when assured that none but American manufactures were permitted to be introduced, their doubts have been removed, their prejudices exploded, and they have carried to the various sections of our country, information and knowledge of the most beneficial kind, and their testimony of what they have here seen has, in many instances, been productive of useful results.

There is still another circumstance connected with this exhibition that affords substantial evidence of the prosperity of our manufactures. It is the great addition to the variety of articles produced: the specimens exhibited exceeded in number those of the seventh exhibition by one hundred and seventy-two, and, in several instances, for want of room, samples only, of articles which were required to be exhibited in quantities, could be displayed.

Annexed, the committee present a list of premiums, which they consider to be due according to the printed list communicated to the manufacturers previous to the exhibition. This list embraces the medals which it has been judged proper to award for articles not enumerated in the list just referred to, but which are considered by the judges to merit this mark of approbation. These premiums the committee request the Board of Managers to award.

On Cotton Goods.

1. Premium No. 58, is due to Peter H. Schenck & Co., of New York, for specimen No. 384, four pieces beaverteens, which are of a good and substantial quality, and adjudged to be much superior to most imported beverteens.

2. Premium, No. 61, is due to William Almond, of Philadelphia, for specimen No. 12, one piece of power-loom woven Marseilles, which is considered by the judges to be a very fair effort, and an evidence that the manufacturer has ability to produce a better article.

3. Premium, No. 63, is due to the Bristol Print Works, Rhode Island, for No. 55, ten pieces furniture chintz; the colours in these goods are vivid, and the patterns showy. In this article, the judges are of opinion, there is an evident improvement.

4. Premium, No. 64, is due to the Merrimack Manufacturing Company, Lowell, Massachusetts, for No. 263 and 264, thirty pieces rich chintz prints, of superior excellence in style, and displaying colours of great brilliancy.

5. Premium, No. 72, is due to Joseph Ripka, of Philadelphia, for No. 24 and 25, Cantoon crape and Cantoon Cord. These are exceedingly good imitations of the foreign article, and very durable and desirable goods.

6. Premium, No. 94, is due to the York Manufacturing Company, Albany, New York, for Nos. 53 and 54, forty pieces of brown and bleached Canton flannels, a superior fabric of uncommon regularity of nap, and presenting a beautifully smooth surface.

Honorary mention is due to William Wister, of Germantown, for

No. 205, five pieces of plate prints, at ten cents per yard; these goods are pronounced by the judges to be substantial and serviceable.

Woollen Goods.

7. Premium, No. 81, is due to the Great Falls Manufacturing Company, Somersworth, N. H. for Nos. 244 and 245, six pieces blue cloths, at three dollars per yard. These goods are pronounced to be well made and well finished.

8. Premium, No. 95, is due to David Knowles, of Blockley, Pa., for No. 11, seven pairs woollen and cotton blankets. Of these goods the judges say that they deserve unqualified commendation; the article appears to combine warmth with lightness, and the union of the two materials for that purpose, accomplishes a desirable object.

9. Premium, No. 92, is due to the Buffalo Woollen Manufacturing Company, Buffalo, N. Y., for No. 524, Wilton super blankets. These are not surpassed by any article of blanketing which has ever been seen by the committee of judges, the whiteness and fleecy character of the fabric deserves especial notice.

10. Premium, No. 80, is due to Wethered & Brothers, of Baltimore, for No. 457, one piece of superfine blue cloth, which is well made, and in the opinion of the judges the best specimen in the exhibition.

11. No. 82, is due to the Great Falls Manufacturing Company, for Nos. 239, 240 and 242, fancy colours broad cloths: the dye is adjudged to be good, the texture fine, and the finish free from objection.

12. Premium, No. 83, is due to Samuel Slater & Sons, of Webster, Massachusetts, for drab and mixed cloths. These goods are highly commended for colour, texture and finish.

13. Premium, No. 78, is due to Churchill Houston & Co. of Groveville, N. J. for mixed sattinetts. Taking into view the quality of the wool of which these goods are manufactured, they are considered the best ever exhibited.

Honorary mention is due to the Middlesex Manufacturing Company, Lowell, Massachusetts, for No. 238, striped cassimeres, which for closeness of texture, and neatness of finish, are highly commended by the judges.

Honorary mention is due to Wethered & Brothers, of Baltimore, for No. 565, one piece of black cassimere. This is spoken of by the judges as being equal in all respects to any cassimere exhibited.

Honorary mention is due to T. R. Fisher, of Wakefield mills, near Germantown, for one piece double milled drab cassimere, which the judges pronounce to be a well manufactured, and a very superior article.

Honorary mention is due to H. Hudson, of Long Island, New York, for No. 272, one piece twilled felting for paper makers, which is adjudged to be a well made article, and appears to be adapted to the purpose for wnich it is intended.

Honorary mention is due to the Salmon Falls Manufacturing Company, New Hampshire, for Nos. 387 and 388, seven pieces brown

cloths. These goods are highly commended by the judges for lustre and richness of finish; they say they have examined them with satisfaction, and commend them with great confidence.

Carpets.

14. Premium, No. 87, is due to the Lowell Carpet Manufacturing Company, Massachusetts, for No. 29. Three pieces superfine ingrain.

15. Premium, No. 89, is due to John Humphreys, of West Farms, New York, for No. 31, four pieces Brussels. Speaking of these specimens of Ingrain and Brussels carpeting, the judges say these goods are of excellent quality and style, and satisfactory assurances have been received that they are exclusively of American workmanship throughout all the processes, from the raw material to the finished product of the loom.

Honorary mention is due to Wiley & Cooper, of Brooklin, N. Y. for No. 429, four pieces floor oil cloth, which are considered equal in quality to any now or heretofore exhibited, and superior in style, having a close resemblance to Brussels carpeting.

Honorary mention is due to the Lowell Carpet Manufacturing Company, of Massachusetts for the very rich display of Wilton rugs; these exhibited a very great improvement in this branch of manufacture.

The committee cannot forbear mentioning two very elegant tufted rugs, manufactured by Isaac M'Cauley, of Philadelphia; these are adjudged to be superior to any exhibited, and had they been deposited within the specified time, the award of a medal would have been recommended.

Silk Goods.

Honorary mention is due to the New York Dyeing and Printing Establishment, for No. 342, specimens of printing on silk handkerchiefs.

Honorary mention is due to James Heald & Harris, of Philadelphia, for Nos. 720 and 721, specimens of printing on silk handkerchiefs and crape shawls.

Honorary mention is due to Micajah Burnet, of the United Society of Shakers, Pleasant Hill, Kentucky, for a silk handkerchief. This article is well made, and from silk raised in their settlement.

Straw Bonnets.

16. Premium, No. 90, is due to Mrs. E. Henley, of Philadelphia, for No. 375, three straw bonnets. These are adjudged to be very superior in quality, and made with great neatness. It is to be regretted that the maker of the plat of which these bonnets are composed, cannot be ascertained by the committee, as an honorary mention of the individual is richly merited.

Honorary mention is due to Mehitable H. Sears, of Prescot, Massachusetts, for No. 492, a specimen of Leghorn braid for bonnets; this is commended by the judges as worthy of high praise.

Honorary mention is due to Mrs. Jane L. Seddinger, of Philadel-

phia, for No. 491, one Leghorn bonnet: much taste has been displayed in the making up of this bonnet.

Honorary mention is due to the Pennsylvania Institution for the Deaf and Dumb, for No. 441, a straw bonnet made by the pupils of that institution, from the raw material; the judges think this a very creditable specimen of this species of manufactures.

Iron and Steel.

Honorary mention is due to the proprietors of the Cumberland Iron Works, Tennessee, for their specimens of rolled iron. The judges pronounce this article as fully comparing with the English chain cable iron, both for strength and ductility.

Surgical Instruments.

No specimens of surgical instruments were exhibited, except those manufactured by Wiegand & Snowden, and as Mr. Wiegand is a member of the Board of Managers, the judges are precluded from noticing them.

Honorary mention is due to Joseph M'Ilhenny, of Philadelphia, for No. 460, a case of artificial teeth: these teeth, the judges say, deserve a favourable notice for the perfection of their forms, the excellence of their colour, and the great smoothness of the enamel.

Hardware.

17. Premium, No. 25, is due to Isaac Babbet, of Taunton, Massachusetts, for No. 61, twelve specimens of tinned cast iron hollow ware. The judges are of opinion that these are equal to any thing of the kind they have ever seen imported.

18. An extra premium is due to M. H. Webster & L. C. Beck, of Albany, New York, for No. 51, seven cast iron skillets, coated inside with porcelain: these specimens were much admired, and are a favourable evidence that the maker of them is about to introduce a new and very desirable article.

19. Premium, No. 30, is due to Holmes, Hotchkiss, Brown & Elton, of Waterbury, Massachusetts, for several bundles of brass and copper wire: these are reported by the judges to possess all the qualities of a good article.

20. No. 34 is due to Dunlop, Madeira & Co. of Chambersburg, Pennsylvania, for No. 64, edge tools for carpenters and joiners. Of these articles the judges remark that "they are not only well formed, but well finished; the best specimens of the kind heretofore exhibited, and, as far as they are able to judge, the quality will correspond with the shape, form, and finish of the specimens."

21. An extra premium is due to T. & B. Rowland, of Philadelphia, for No. 86, five shovels, highly commended for their good qualities.

22. An extra premium is due to William Rowland, of Philadelphia, for No. 410 and 414 inclusive, an assortment of mill, cross-cut, tenon, and pit saws; these are adjudged to be first rate articles, and the best exhibited.

23. Premium No. 26, is due to Seth Boyden, of Newark, N. J., for No. 8, various specimens of malleable cast iron. Of these the judges express the opinion that their malleable and tenacious qualities are equal to any imported articles.

Honorary mention is due to Crocket & Boyden, of Newark, N. J. for No. 552, various specimens of malleable cast iron: these are adjudged to be quite equal to the last mentioned articles, but were not exhibited in quantity sufficient to compete for the medal.

Honorary mention is due to T. V. Blackmore, of Philadelphia, for No. 162, two japanned waiters. The japanning of these goods does credit to the artisan, and shows a great improvement on those exhibited on a former occasion; had the waiters been made here of American sheet iron, a medal would have been awarded.

Honorary mention is due to John Garret, of Philadelphia, for No. 6, a card of Dental files, of which the judges remark that they are equal to the English.

Honorary mention is due to David Bassett, of Derby, Connecticut, for No. 44, twenty-five screw augers. These are an excellent article, and, to every appearance, of a superior quality; the workmanship reflects credit on the manufacturer.

Honorary mention is due to J. M. L. & W. H. Scovill, of Waterbury, Conecticut, No. 124, a specimen of plated metal. This is pronounced to be an excellent article; it can be made as cheap as the imported, and in sufficient quantity to supply the demand.

Honorary mention is due to Rockwell & Hensdale, of Winchester, Connecticut, for No. 284, nine scythes: these are a specimen of good workmanship, and equal to those imported.

Honorary mention is due to the proprietors of the Mill Dam Foundry, near Boston, for Nos. 474 to 476, seven dozen plane irons, to every appearance a first rate article: the judges express a hope that all planes hereafter exhibited may be finished with American manufactured irons.

Honorary mention is due to Robinson Jones & Co., of Attleboro', Massachusetts, for No. 368, one case of gilt buttons: this is a specimen of well finished goods, and of superior gilding.

Models.

An honorary mention is due to J. Millington, of Philadelphia, for models of the steam engine: the execution of these models was remarkably neat, and one of them attracted particular attention from its finish.

Philosophical Apparatus.

An honorary mention is due to Alva Mason, of Philadelphia, for various articles of philosophical apparatus, which the judges are of opinion fully sustain the high character which Mr. Mason has attained in this branch of business.

Honorary mention is due to Josiah Loring, of Boston, for three globes deposited in the exhibition: of two of these it is remarked by

the judges that the execution of the maps is good; their covering of varnish remarkably smooth and transparent, and the mounting generally well executed; the third, with an "ivory surface," is particularly commended.

Honorary mention is due to John Marshall, of Philadelphia, for apothecary's balances, the workmanship of which, it is said by the judges, to be very creditable to Mr. Marshall.

Rifles.

24. Premium, No. 6, is due to Jacob Kunz, of Philadelphia, for No. 716, a rifle combining the usual good qualities, with excellent workmanship and finish, and at a fair price.

Lamps.

25. Premium, No. 19, is due to C. Cornelius & Son, of Philadelphia, for the best and most extensive variety of lamps; the mantel lamps were particularly admired, the brass castings are graceful, and exhibit a great richness of hue. The bronzing is decidedly superior to that of former specimens.

26. An extra premium is due to the New England Glass Company, Boston, for their glass mantel lamps. The cut pillars, icicles, and other pendulous ornaments, of these splendid lamps, are the first of the kind presented to the public from American sources, and they bear a strict scrutiny for transparency, lustre, and workmanship.

Honorary mention is due to J. W. & E. Kirk, of Philadelphia, for several lamps and other articles of anthracite coal: these are considered as showing a great improvement over similar articles reported upon at the last exhibition.

Musical Instruments.

27. Premium, No. 24, is due to Thomas Loud, of Philadelphia, for the best square piano, the cabinet work of which is of oak, the growth of the United States.

Honorary mention is due to Nunns, Clark & Co., of New York, for a square piano, the cabinet work of which is of maple. Of the qualities of this instrument the judges remark that it and that made by Mr. Loud, are so nearly equal that they experienced difficulty in deciding between them.

Honorary mention is due to E. N. Scherr, of Philadelphia, for a square piano, which was adjudged to be the best instrument of the kind presented at the exhibition. It is, however, said to possess an advantage over the others from the fact that the treble part was three stringed.

China, Glass, and Queensware.

28. An extra premium is due to the Boston, and Sandwich Glass Company, for No. 216, various specimens of pressed glass: these the judges think have very considerably improved since our last exhibition.

29. Premium, No. 16, is due to F. A. Marston, of Baltimore, for the best cut glass, which is reported by the judges to be equal to any similar article they had ever seen imported, for form, accuracy of cutting, brilliancy of colour, and highly finished polish.

Honorary mention is due to the American Pottery Company, of Jersey City, for specimens of American queensware. This article the judges esteem the best specimens of the kind they have ever seen of American manufacture.

Honorary mention is due to Joseph Hemphill, of Philadelphia, for No. 76, various samples of American porcelain, in the moulding and glazing of which great improvement has been made since the last exhibition; the body of the article is considered equal, if not superior, to that of the imported.

Marble.

30. Premium, No. 101, is due to Malloch, Purves & Malloch, of Philadelphia, for two mantels, entirely of Pennsylvania clouded marble, beautiful specimens of material, well matched, firmly put together, and highly polished, considered by the judges the best in the exhibition.

Honorary mention is due to Peter Fritz, of Philadelphia, for two mantels of the same pattern as the preceding pair, of good marble and workmanship.

Hats and Caps.

Honorary mention is due to A. Russel, jr. & Co. of Philadelphia, for several specimens of hats and caps; these are considered very creditable to the manufacturers, and the hats would have been entitled to the premium could the terms to supply the requisite quantity have been complied with.

Honorary mention is due to Thomas Elmes & Co. of Philadelphia, for specimens of silk hats and fur caps: these are considered very well and handsomely made, and in all respects entitled to commendation.

Honorary mention is due to Joseph Chandler Smith, for specimens of black fur hats, No. 559, adjudged the best in the exhibition for the price.

Books and Stationary.

Honorary mention is due to Wm. F. Geddes, of Philadelphia, for Nos. 533 and 545, specimens of printing in gold, silver, and bronze: these are adjudged to be very elegant and creditable evidences of the advanced state to which the typographic art has arrived in our country.

Honorary mention is due to Desilver, jr., Herse & Lindsey, of Philadelphia, for No. 320, a Journal and Ledger, the binding of which is executed in a very superior manner, and the ruling and faint lining, the judges declare to be the best they have ever noticed.

Honorary mention is due to James M. Porter of Easton, Pennsylvania; for specimens of school slates, manufactured by him from the quarries in Northampton county, Pa.

Paper Hangings.

Honorary mention is due to Beaty & Arey, of Philadelphia, for various specimens of paper hangings, which show an evident improvement in this branch of manufactures.

Shoes.

Honorary mention is due to Samuel D. Breed, of Philadelphia, for his gum elastic shoes with leather soles cemented to them: the judges are of opinion that by this invention the only disadvantage attendant on the use of these over shoes is completely obviated.

Fine Arts.

31. An extra premium is due to William J. Mullen of Philadelphia, for two gold watch dials. These, which are said to be the first successful attempt to compete with foreigners in this branch of the mechanic arts, are highly deserving of notice, for beauty of workmanship, chasteness of design and elaborate finish.

32. An extra premium is due to Asa Spencer, of Philadelphia, for specimens of medal ruling: these splendid imitations give to a flat surface an appearance of all the relief possessed by the best medals, and in so perfect a manner, as not to be distinguished from them, without the nicest scrutiny.

33. Premium, No. 85, is due to S. R. Mason, of Philadelphia, for the best perspective drawing of machinery: the judges speak of this in terms of high commendation, both for the faithfulness of the design, and the excellence of the execution.

Honorary mention is due to Wm. D. Parish, of Philadelphia, for a perspective drawing of an electrical machine. A very beautiful performance, which reflects credit on the artist.

Honorary mention is due to William Newlan, of Philadelphia, for specimens of mould carving, which exhibit excellent workmanship, and must prove highly acceptable to all concerned in ornamental casting.

Fancy Articles.

Honorary mention is due to John Yard, jr., of Philadelphia, for No. 428, a case of fancy pearl work: the judges recommend these articles to particular notice, for the skill displayed in a new branch of manufacture, and the comparatively low price for which the articles exhibited are sold.

Honorary mention is due to the Institution for the Instruction of the Blind, Philadelphia, for Nos. 579 and 580, six baskets and one guard chain: these are considered worthy of notice from their intrinsic merit, and still more so, from the proof they afford of the great

value of the benevolent institutions under whose auspices they have been sent to the exhibition.

Honorary mention is due to the United Society of Shakers, of New Lebanon, New York, for a variety of useful articles manufactured by them, and deposited by Gideon Cox.

Premiums were offered for several articles, of which models and specimens were exhibited, but as they require more time to test their utility than has elapsed since the exhibition, the committee have omitted to enumerate them, but will submit a separate report on those subjects, so soon as the judges shall have reported to them.

From the great extent of the catalogue of the exhibition, the committee are reluctantly compelled to omit mentioning in their report many valuable and interesting articles which enriched the collection; but as the reports of the judges will probably be published, which in many instances treat of the articles in detail, and speak of them with justice and candour, it is believed that a more particular report from this committee would be unnecessary.

The medals which are recommended by the committee to be awarded by the Board, they believe can be procured, without difficulty, in time to be distributed to the successful competitors, at the delivery of an address for which the Board have made arrangements.

In closing their report, the committee would do injustice to their own feelings, were they to omit mentioning the great obligations, which they, in common with the Institute, are under to the numerous friends who so promptly responded to their request, to act in conjunction with them, as a committee of arrangement; their attention to the arrangement of the rooms, and the manner in which the goods were displayed, deserve commendation and thanks.

To the gentlemen who undertook the delicate and difficult task of judges, the committee feel themselves also under great obligations; the labour bestowed in their examination of the articles, and the impartiality of the decisions in relation to their merits, were highly creditable to the different committees.

The depositors of goods on this occasion have come forward with a spirit worthy of our highest praise; the considerable expense incurred in many cases in sending their productions to the exhibition, will, the committee trust, be more than compensated by the good effect produced on the public mind, by the rich display of the manufactures of our country, which such co-operation alone enabled the Institute to furnish.

All which is respectfully submitted by

Samuel J. Robbins,	Isaiah Lukens,
William H. Keating,	Alexander Ferguson,
Frederick Fraley,	J. Henry Bulkley,
M. W. Baldwin,	Alexander M'Clurg,
Joshua G. Harker,	

Committee on Premiums and Exhibitions.

Published by order of the Board of Managers.

W. Hamilton, *Actuary.* Alex. Dallas Bache, *Chairman.*

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN JUNE, 1833.

With Remarks and Exemplifications, by the Editor.

1. For a *Grist Mill;* Moses Chapman, Girrard, Erie county, New York, June 1.

The mill intended to be described is one of the portable kind; the so called description, however, would afford but little insight into its construction, and none into what is to be considered as the invention of the patentee. The drawing, which we suppose has been made from the model, is, therefore, our principal guide in forming any judgment of the affair.

The point in which this differs from the greater number of portable mills, although not from the whole of them, is, in there being three stones, the upper and lower of which are to be stationary, and the middle one only to be the runner; but three stoned mills, so far as we can recollect, have heretofore had the stones placed vertically, whilst in this they stand horizontally. This may be new, but even if it is both "new and useful," as it is not claimed, but is mixed up in the specification with girths, guides, drivers, bridge trees, and shoes, which are old, the patent does not secure any thing.

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2. For a *Machine for Pressing and Finishing Bricks;* Charles Hinkle, Allentown, Lehigh county, Pennsylvania, June 1.

The mould in which the brick is to be pressed is made of cast iron, and forms part of a carriage, which runs upon ways, to bring it under the part where the pressure is to be made. The pressure is given by means of a lever which is to be brought down by hand. This lever is fixed to an horizontal axle, and has a progressive cam which operates upon a friction roller on the top of a follower. When the brick has been pressed, and the carriage is drawn out, the follower is raised by the action of levers contrived for that purpose; these levers also raise an iron plate, which forms the bottom of the mould, and thus delivers the brick from it.

The claim is to "the *combination and arrangement* of the several parts of the before described machine, and not to the individual parts themselves, as they have been long known and used."

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3. For a *Planing Machine;* Benjamin Kugler, city of Philadelphia, June 3.

The machinery here patented is described with much care and minuteness, and the parts of which it is constituted are represented by a number of plans, sections, and perspective drawings, without which a clear idea of it cannot be conveyed; its general action is as follows—

The plane, which is of metal, is firmly fixed, and is provided with a number of irons, placed one behind the other; the first of these is

set rank, to operate as a jack plane, and the succeeding ones have different degrees of hold. Irons intended for grooving are also set edgewise, in the same metallic plane. In the drawing, six irons are represented, one behind the other.

The board to be planed is drawn, or rather driven, through the machine, under the plane irons. This is effected by means of an "endless plate chain," which passes round cog wheels at each end of the machine; upon the top of this plate chain the boards are to be placed, and by it they are carried under the planing, and between the grooving irons.

There are proper fixtures for preventing the springing of the board, and for various other purposes, many of which being considered as mere matters of arrangement, are not claimed by the patentee. The things claimed are "the holding box, and the machine in which the board is prevented from bending, breaking, or swerving from its proper direction, and free ingress given to it into the planing box, while the force for pushing it through is applied to the dog at the end of the board. The construction of the planing box, and the combination and arrangement of the bits therein, and the mode in which the friction is diminished by the arrangement of the reverse angles."

We are not informed respecting the final success of this machine, but we know that it has been put up with much care and at great expense. The main difficulty which presents itself to us is one which we have before had occasion to express in relation to planing machines with a large number of irons acting simultaneously on a great width of surface; it seems to us that the resistance to be overcome is too great, especially when boards are hard, crossgrained, and knotty. The hand humours such boards, but the machine waits not to accommodate its customers, according to their different dispositions, but treats all alike. The patentee we know to be a gentleman of much ingenuity and perseverance, and we shall be gratified to hear that these attributes have enabled him in this case to triumph over all difficulties.

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4. For a *Horse Power for propelling machinery;* Charles Keller, city of Washington, D. C., June 3.

The lever to which the horse is attached is fixed to the vertical shaft af a cog wheel, and the teeth of this take into an endless screw formed upon a horizontal shaft which carries a band wheel, or whirl, a strap from which may be extended to drive machinery. The cog wheel, and the horizontal shaft which it drives, may be placed below the horse walk, and the apparatus be thus confined to a small space, and rendered portable. The claim made is to "the application of the well known principle of the endless screw and cog wheel to a portable horse power for driving machinery."

The advantage expected to result from this application is the obtaining the required speed by no further gearing than that described. The difficulty to be apprehended is from the great friction to which the endless screw must be subjected, which, if the materials are not

extremely hard, and the rubbing parts are not constantly supplied with unguents, must soon wear it out.

The application of the endless screw to a portable horse power, is, we believe, new; it, however, has been used for driving bolters in flour mills, and for other purposes. Nairne, a well known philosophical instrument maker, of London, manufactured, about sixty years ago, many globe electrifying machines, which were turned by a toothed wheel, acting upon an endless screw, one of which we formerly owned.

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5. For a *Machine for Dressing Hemp and Flax;* Hezekiah Hawley, Louisville, Jefferson county, Kentucky, June 4.

Much pains are taken in this specification to explain the construction and operation of the machine, in the most exact manner, yet notwithstanding this, and although we have read it through with some attention, our ideas are not quite clear upon several points relating to it; the description, we think, has been laboured into obscurity. Leaving the manipulation, which is the heaviest portion of the specification, we will merely observe that the flax to be dressed, is confined between the bars of an iron clamp, which embraces its ends, and which is of the length of the dressing roller. The hemp, of course, should be spread evenly the whole length. It is then to be passed between the edge of a straight bar of iron, and the revolving beaters, which consist of four straight bars attached to a revolving iron roller.

There is a number of other appendages which we have not named, and could not describe without figures. After presenting us with the whole machine, the description terminates without any claim; we are therefore left to suppose that the entire arrangement is considered by the patentee as new.

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6. For *Manufacturing Butt Hinges* of brass, copper, or other metal; Henry P. Anderson and Josiah Sawyer, Waterford, Saratoga county, New York, June 18.

These hinges are to be made of sheet metal, which is first to be cut into strips, and then drawn through a plate which bends the two edges round so as to form a tube. The opening in the draw plate consists of two holes, united by a slit, or opening, equal to the thickness of the metal. When drawn, the strip is to be slit along the middle, and then cut into lengths by circular cutters.

A machine, called a rotary joint cutter, is employed to form the knuckles, and is constructed as follows. Two wheels of iron, which may be a foot in diameter, and in thickness equal to the length of the hinge to be made, are placed upon a horizontal shaft. Kerfs are made into these wheels, across their faces, to a depth sufficient to receive the hinge plate. These may be an inch, or more, apart. The cutters which form the joints stand in front of, and revolve close to, these wheels, and receive a rapid motion, whilst that of the wheels must be such as to admit of the pieces being slipped, by hand, into the kerfs, or notches, which hold them while they are cut, and from which they fall after passing the revolving cutters.

"Many parts of our machinery and tools are not new, but we claim as our discovery, the drawing of the metal through dies rolling the edges over, for manufacturing butt hinges. The machine for cutting out the joints, which we call a rotary joint cutter, we claim as our invention. In these two consist the main advantages of our mode of manufacturing butt hinges. On these we rest our claims as to our new and useful improvements, but have given a description of the other parts of the process, so as to enable the public to have the benefit of them."

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7. For a *Machine for Cleaning, Softening, Separating, and Shortening, the Fibres of Hemp and Flax;* Ezekiah Hawley, Louisville, Jefferson county, Kentucky, June 29.

The main part of this machine consists of two iron rollers, from two to four feet in length, and from two and a half to six inches in diameter; these are to be made so as to run one above the other, the upper one being borne down by weights. There is another roller, by which the flax or hemp is conducted between the iron rollers operating as a kind of feeder to them. When the ends appear from between the rollers they are turned up and made to wind round the upper one, where the quantity proper to be operated on at once is kept revolving until the breaking is completed. The material is then to be removed by a card, or some similar contrivance, and the fibres to be cleaned. When the flax or hemp is first wound on, the motion of the rollers is to be slow, after which it is to be much accellerated.

This constitutes the whole operation, and the machinery has the credit of great simplicity, to which if it add that of efficiency, the invention will be a valuable one. There is no claim made, the principle of breaking by such a machine being considered as essentially new. It differs materially from that patented by the same gentleman on the 4th of the month, although the two machines are for the same purpose.

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8. For a *Lavender Balsam for preserving and restoring the human Hair;* Elizabeth Bartlett, city of New York, June 29.

Two quarts of flax seed are to be boiled in three of rain water, until reduced to one-third of the quantity, when the mucilage is to be strained; four quarts of whiskey are then to be added, together with two ounces of oil of lavender.

This *balsam* is to be applied morning and evening by the aid of a hair brush, and we are told that one quart will suffice to restore hair to the bald pate, and one pint to prevent the catastrophe, after it has commenced falling off.

We have no doubt that this balsam will do quite as much good as the far famed Macassar oil, provided it can be sold at as high a price; if it is sold cheap, however, we do not believe that it will be of much use either to the patient or the doctor.

9. For an improvement in *Leather Cutters;* Joseph S. Bishop, Wayne, Kennebeck county, Maine, June 29.

This machine is for slitting strips of leather so as to reduce them to a thickness for saddlery, harness, &c. A knife is to be fixed like that of a spoke shave; a spring is to bear upon the leather to keep it down as it passes under the knife, and the leather is to be drawn through by rolling it round a shaft turned by a crank in the rear of the knife.

The claim is to "the permanent knife; the spring; the shaft; the power applied to this purpose; and, in fine, the invention of the whole machine."

Machines for this purpose, with permanent knives, have been long known and used; we can answer for them for nearly thirty years, and they are not therefore the subjects for a patent. If any claim could, in this case, be sustained, it must be to the particular arrangement of the parts as adopted by the patentee, the general plan being old.

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10. For *Making Splits for Baskets;* Joseph L. Border, Shrewsbury, Monmouth county, New Jersey, June 29.

The splits, or strips, are to be sawed, by circular saws, from any tough kind of wood. This constitutes the whole process, the advantages of which are said to be a saving of wood and labour, and the formation of a stronger, more compact, and better basket.

If the greater part of these advantages are gained, they may suffice; we are not prepared to believe, however, that sawed strips, which must, to some extent, be cross-grained, can be stronger than split ones.

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11. For an improved mode of *Covering the Roofs of Buildings with Sheet Tin and other Rolled Metals;* Charles Bonnycastle, Charlottesville, Albemarle county, Virginia, June 29.

The method here patented is intended to obviate the effects of the expansion and contraction of the metal, which has not been effectually done by the plans most generally pursued. The sketch in the margin is a section of the joinings of the plates, along the plane of the roof, from the eaves to the ridge. The plates *a a* have their edges turned up, and curved a little out; the plate *b* is a strap which is formed of a strip of tin bent over so as to embrace the edges of two contiguous plates, and is nailed down between them by a nail *c*. A tubular piece, *d*, covers over them, and forms a capping that effectually prevents the introduction of rain.

The claim is to the above described mode of fastening sheets of tin, and other rolled metallic plates, to the roofs of buildings; and to the prescribed mode of covering the joints.

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12. For a *Machine for Cutting Hemp, Flax, and also*

grains and grasses of various kinds; Thomas A. Anderson, M'Minn county, Tennessee, June 22.

This machine is to run upon four wheels, two of them, we suppose, may be of the ordinary size of large carriage wheels, the other two about one-third of their diameter. The large wheels are fixed upon an axle which revolves with them, and upon the inner side of one of them, there are cogs, which drive a wheel turning on a vertical shaft running in the frame work of the machinery; this last wheel takes into one on a horizontal shaft, elevated above the large wheel; this horizontal shaft extends along towards the other end of the carriage, and has on its end a vertical wheel which turns a vertical shaft reaching nearly down to the ground; a scythe or cutter is secured to, and extends out at right angles from, the lower end of this shaft, and as it revolves is to cut the grains, or grasses, in its course.

There is no claim, the patentee probably not being aware that any similar attempts had been made to mow with apparatus of this kind; there have, however, been many machines acting upon similar principles, though varying in form from that above noticed, but the objections to them all are so numerous that after a brief existence, they have made their exit.

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13. For a *Portable Horse Power;* Samuel Allen, Saratoga Springs, Saratoga county, New York, June 29.

This machine, like most of the portable horse powers, has the gearing of wheel work below the lever, or sweep, to which the horse is to be attached. There are three wheels and three pinions, upon suitable shafts; the last shaft being a horizontal one, and passing along close to the ground, where it is boxed, or covered, to prevent injury from the feet of the horses; at its extreme end it has a whirl, from which a band is to extend to operate upon any machinery. The main point claimed is the mode of making the wheels, which are to consist of iron rims, with arms of wood. The iron rims are to be strengthened by a flanch, which projects inwards, and serves also as a bearing for the wooden arms.

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14. For an instrument for *Cutting Bungs, or Stoppers, for Beer or other Barrels;* Robert Barlow, city of Philadelphia, June 29.

This instrument is a hollow punch, made exactly like those used for cutting the wadding of guns, and which have frequently been made larger for other purposes. In the present instance, it must, of course, be of the size of the required bung, and this must be cut endways of the wood.

We doubt the validity of any claim to such an instrument, because it is not new; but admitting the claim to the instrument to be *good*, we more than doubt its making bungs which will be so. The carbonic acid will escape through the bung; this we know from experience, and it might be known without it, as the wood consists of a series of tubular vessels extending longitudinally. The form of the

bung also, will be objectionable; it will be cylindrical, whilst it ought to be conical.

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15. For a *Machine for Spinning Silk;* Adam Brooks, Scituate, Plymouth county, Massachusetts, June 29.

This machine is intended to draw the threads from the cocoons, and unite them without reeling, in sufficient numbers to carry them over a cylinder to spindles, where they are spun into a thread ready for filling in weaving, or for doubling and twisting for sewing silk. The apparatus, as represented, is simple, and the patentee avers that it facilitates the business of preparing the silk in various ways, "drawing the fibres from the cocoons by a steady motion, breaking the fibres less than by reeling in the common way: without loss from splitting or tangling; much firmer, smoother, stronger, and more even than by any other method, and with greater despatch."

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16. For an improvement in the *Construction of Iron Bridges;* Augustus Canfield, Paterson, Essex county, New Jersey, June 29.

This is a chain bridge, and is, on the drawing, called a tension bridge. It is represented as having a span of eighty feet; and as having two string pieces, or chains, one above the other, in a straight line, or rather *arching a little upwards.* The upper and lower string pieces, as shown in the drawing, are ten in number, and the links are of course eight feet in length; they are to be of wrought iron; the distance between the upper and lower string pieces is also represented as eight feet. Vertical bars connect the upper and lower string pieces at each joint, thus dividing the whole into squares of eight feet; diagonal braces, pointing from the centre towards the abutments, are placed in each of the squares; these braces are to be of cast iron. There is no claim made, but "the inventor believes this to be the best arrangement of the materials that can be made." He also remarks that "in this construction, the stress upon each part by any given pressure, is a matter of simple calculation;" we are apprehensive, however, that a correct calculation would not confirm the opinion that this is "the best arrangement of the materials which could be made;" we, however, leave it to others to institute the inquiry, for which we will readily find room in our pages.

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17. For a *Machine for Thrashing Grain;* Stephen Norton, New Lebanon, Columbia county, New York, June 29.

The claims made to the improvements in the thrashing machine, are to "the mode of constructing and hanging the beaters; the formation of the concave, and the manner of causing it to recede when fed too fast." Neither of these alterations can be considered as changing the character of the machine as it previously existed; the beaters are to be of the swinging kind, fixed to the heads by a bolt passing through eyes at the ends; but instead of a single eye at each end, the present patentee puts two, embracing each side of the plate of which the head is formed; this alteration, were it new, would produce the

same advantage, and be as worthy of a patent, as a fifth wheel to a coach. The concave is, as usual, to be made to recede by the action of springs, but the iron with which it is armed is put on to it in a way somewhat differing from the ordinary mode.

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18. For a machine for *Cutting the Tenons or Spokes for Wheels;* Pitner Emmitt, Hopewell, York county, Pennsylvania, June 29.

A vertical piece, called a driver, is to be forced down by a lever, it being made to slide truly through openings in the frame work of the machine. On the lower end of the driver, four cutters are to be fastened by screw bolts; two of these are to cut the shoulders, and two the sides of the tenon, the spoke being held upon a bed, or cutting block.

We have on a former occasion made some remarks upon a similar mode of cutting tenons, which was made the subject of a patent, and by turning over our pages could furnish day and date; but as we do not think the plan a good one, the interference does not present itself as a question of much importance. There are but few workmen who will require argument to induce them to believe that circular or other saws, adopted in former tenoning machines, are much better than the cutters above proposed; although it would be difficult to convince them that in most kinds of stuff tenons could be well cut by it.

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19. For *Machinery for Forging Axes;* David Hinman, Canton, Hartford county, Connecticut, June 29.

Although this is termed a machine for forging axes, there is not a word in the description of it which applies any more to this particular business, than it would to a hundred others.

The machine described is to act as a powerful press, which is to be used to force the heated metal into the proper form by placing it between dies. A particular press is described, but this is only given as one which the patentee approves, and he expressly says that a powerful press of any of the common constructions may be employed. He claims "the application of a powerful press of the above or any of the more common constructions, operating on dies, moulds, or swages, in a direct, or nearly direct, manner, to give to the heated iron and steel the several forms which are successively requisite in forging it into all kinds of axes."

We have uniformly maintained the opinion that a patent cannot be sustained for the mere application of a well known process, or machine, to the making of a new article. If a machine must undergo some particular modification to enable it to perform a new process, or if there is any thing peculiar in the mode of operating with it, there is then invention, and of course novelty, but not otherwise.

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20. For *Boxes for reducing Friction in Mill Gudgeons;* Frederick Eichelberger, Creagerstown, Frederick county, Maryland, June 29.

The gudgeons of mill shafts are to run upon a large roller, in a suitable box; and there are to be two smaller lateral rollers to sustain the gudgeons sideways. "The foregoing box, wheel, and roller," are the things claimed, and those who buy a right, will not, we presume, thereby forfeit that privilege of using them, which they already have.

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21. For a *Hill-side Plough*, called the "hinged wing hill-side plough;" William B. Donald, Rockbridge county, Virginia, June 29.

This hill side plough, like several which have preceded it, has two mouldboards, and two shares, above which the beam is made to swivel upon a bolt, so that the horses may be turned, carrying the beam round, without moving the body of the plough. There is a sliding ferule which is to be displaced and replaced by a rod, every time the beam is turned; its use is to clasp the lower part of the plough to the beam. This appears to be rather an awkward contrivance, and very inferior to some which have been previously adopted in similar ploughs. The part relied on by the patentee is what he denominates a *hinged wing*. The mouldboards are, in their fore parts, like those in common use, but they terminate abruptly, the piece called the hinged wing serving to make out the hind or terminating part of either mouldboard. This hinged wing is a plate of cast iron, turning on a bolt like a hinge; we are told by the patentee that it is very easily managed, but it requires time to determine this point; the dirt, stubble, and blows, to which a plough is subjected will be likely to interfere with the free action and permanence of the movable parts.

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22. For a *Chimney Cap* for increasing the draft in furnaces of steam-boats and locomotive engines; James P. Espy, city of Philadelphia, June 29.

(See specification.)

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23. For a *Machine for making Rivets, Heading Screws*, and performing other similar operations; Thomas W. Harvey, Jamestown, Chataque county, New York, June 29.

This machine is too complex to admit of its being described in words, or even with drawings, without presenting a number of its parts separately. As it is intended for the making of large rivets, such as those used for tanks and steam engine boilers, which require considerable force in the formation of their heads by pressure, the movements for this purpose, as well as for cutting off the bars, are mostly effected by means of toggle joints. In making rivets of the smaller kind, heading screws, and other operations which do not require the upsetting of a large portion of metal, the wire, or rod, does not require to be heated; but for boiler rivets, this must be done, and on this account provision is made for allowing water to run upon the dies to prevent their being softened by the heat.

The machine is described by references to the drawings throughout, and the specification concludes in the following manner,—"Most of

the parts which I have described, and represented, are not, when taken individually, new; but I have so combined them as to give to the whole a peculiar character, and to produce an effect which is new and useful. It is therefore upon the general arrangement and combination of the parts by which this machine is distinguished from all others which have been constructed for similar purposes, that I found my claim to a patent. In the individual parts, however, I claim the particular construction of the cam No. 1, as described and represented. I also claim the arrangement of the toggle joint by which the shears are opened and closed by the vibration of the bar marked *f* in the drawing."

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24. For *Machinery for Sawing Circular Forms or Figures from Wood;* Levi Hitchcock, Springfield, Hampden county, Massachusetts, June 29.

The machine described consists, mainly, of a circular saw, which is to be concavo-convex, or, in other words, to be a segment of a hollow sphere, suiting the curvature of the article to be cut. The saw is to be fixed upon an axis, like other circular saws, and the stuff to be cut fed to it by suitable fixtures which gauge and guide it. The claim made is to "the application of the circular saw to the cutting and shaping of circular forms, such as coach and wagon felloes, and all sorts of circular work for carriages and chairs; and to the method of adapting the shape of the saw to effect this object."

It is said that pieces should be cut out of the circular plate, forming notches half an inch, or more, wide, extending from the periphery some way in towards the centre, which will facilitate the raising of the plate into the proper form; this, we suppose, is what is intended by "the method of adopting the shape," &c.

It appears rather singular that the articles to which this mode of sawing is better adapted than to most others, is not at all mentioned in the specification, that of staves, which require to be rounded in every direction, as stuff cut by such a saw will necessarily be; perhaps the cause of this omission may be found in the fact that a patent was obtained by Philip Cornell on the 11th of April, 1832, for sawing bulging staves with a plano-convex saw, such as is above described, (see vol. x. p. 236.) It is a mistake, however, to suppose that another man's machine can be taken and applied to a new purpose, and thus become the subject of a new patent; yet this is all that is attempted in the present instance.

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25. For a *Grooving Machine to form the Grooves for Pannels*, either in straight, or in curved work; David H. Hanson, Weare, Hillsborough county, New Hampshire, June 29.

The grooving is to be effected by a cutter, which stands out from the end of a vertical spindle, running in collars, and made to revolve by means of whirls and bands. The cutter operates something like a drill, or auger, having edges on its end and its two sides; its diameter must be equal to the width of the groove to be cut: there are rests

or guides to direct the stuff, which is held in the hands, so that whether curved or straight, by forcing the stuff on, the groove shall be regularly cut. This machine, it is said, works at least seven times as rapidly as any one previously used for the purpose. The claim is to "the spiral cutter, or groover, and the combination or arrangement of the machinery to effect its use."

The combination of the machinery has nothing in it new, or necessary to the action of the cutter, as other, and better arrangements, may be easily made; this, however, will not affect the use of the cutter. The size and construction of a frame for sustaining the apparatus is given with all the minuteness which might be required in mathematical admeasurement, whilst they are things which every workman would make equally well, although deviating in every particular from the directions given.

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26. For an *Improvement in the Anthracite Coal Stove, by closing the ash pit, illuminating the front, and transferring the door to the top thereof;* Eliphalet Nott, Schenectady, state of New York, June 29.

This is the first of a series of eleven patents, the remainder of which will follow the account of this, in regular succession, as they were all applied for and issued at the same time.

Our readers will recollect the notices of three patents previously obtained for Dr. Nott's stoves for the combustion of anthracite; and among those who live in our cities there are but few who have not seen them in actual operation. The greater number of these new patents are taken for the individual improvements which in their combined state are to be found in the stove as it already exists. The reason for obtaining these several patents, we have been informed, is the frequent invasion of the right of the patentee by manufacturers who adopt one or more of his improvements in their stoves, and seem to think that this may be done with impunity, provided they do not take the whole. Although, in this point, they are grossly mistaken, it has been thought better to exhibit each of the parts as patented in its individual character; for should this procedure not secure the rights of the inventor more perfectly, it has been supposed that it might serve as a beacon to invaders, and thus prevent the necessity of resorting to the courts of law.

We shall do but little more than give the claims set up in these new patents, as in so doing we must occupy quite as much room as we can conveniently devote to an individual subject, and ask quite as much from our readers as most of them will be willing to give.

The claim appended to the specification of the patent, the title of which is given above, is in the following words.

"I therefore claim as my improvement the illuminating of the front of an anthracite coal stove, and the providing of access thereto vertically, for the admission of fuel, and the use of the poker, by combining in front a vertical grate, and an exterior sash for mica, or other transparent substance, with an opening at top governed by a door or

lid, and this whether the closed ash pit, with its inlet for air, governed by a valve, or an ash drawer operating as a valve, be added to the foregoing combination or not, though such addition is preferred; together with the uses to which said combination has been, or may be applied."

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27. For the *Construction of Sashes for Mica, in the front of Coal Stoves;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I claim as my invention and improvement the making use of cast iron as aforesaid; together with the uses to which the same has been or may be applied."

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28. For an improvement in the *Construction of the Vertical Grate, and the manner of combining therewith the sash for mica, and the inlet for fuel, in an anthracite coal stove;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement in anthracite coal stoves, having their inlet for fuel at top, the preventing of the falling out of ashes, and the warping of the front grate, by dividing the same vertically into sections as aforesaid, and whether so divided or not, by combining the same with its illuminating sash in front in the manner above set forth: together with the uses to which said improvement has been, or may hereafter, be applied; irrespective of the inlet for fuel at top, and irrespective of every other provision with which the same may be combined in stoves or furnaces of any sort."

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29. For an improvement in *The Lining between which and the front plate, the flue for the ascent of air, and the descent of ashes to the ash pit, is formed in anthracite coal stoves;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement, the preventing of the warping, and the facilitating of the removal of the lining aforesaid, by the making use of a movable, in place of a fixed, plate therefor; and that whether the same consist of one entire plate, or several separate sections; and the combination thereof with the vertical front grate, and its exterior sash for mica, with a flue between the two as aforesaid; together with the uses to which the same has been, or may hereafter be, applied in stoves or furnaces."

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30. For *Preventing the escape of Heat from the top of a pile of ignited fuel, by placing over the same a movable flat;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement, the preventing of the escape of heat from the top of a pile of ignited fuel, contained in a chamber of combustion constructed as aforesaid, by combining therewith a movable flat: the same being placed over said

fuel, and left free to descend thereon, as aforesaid; together with the uses to which the same has been, or may hereafter be, applied."

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31. For an improvement in the *Construction of Tops for Stoves, by a combination of sections cast separately;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement for preventing of the tops of stoves from cracking, the casting the same in sections, or dividing the same into sections when cast entire, and thereafter combining said sections in one whole, as aforesaid, together with the uses to which the same has been, or may hereafter be, applied in stoves or furnaces."

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32. For *The material, combination, and confinement, in place of the damper and handle, as employed in common stove pipe;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement, the preventing of the warping and corroding of dampers and handles in common stove pipe, by making use of cast iron in the construction of the same; and when so constructed, in combining and retaining the same in place, in manner aforesaid; together with the uses to which the same has been, or may hereafter be, applied in stove pipe."

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33. For the *Construction and adjustment of the brick forming the flue, and employed in confining the combustion to the base of the fuel, contained in anthracite coal stoves;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement, the providing for removing and restoring the front of flue aforesaid, by shortening the brick or other slabs of which the same is composed, so that they will freely enter the caliber of the chamber, and by projecting from the right and left jamb brick, the requisite truss or other fixtures for sustaining and confining the same in place as aforesaid; together with the uses to which said improvement has been or hereafter may be may be applied in stoves and furnaces."

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34. For the *Material form, and construction of stove pipe, to be employed where anthracite coal is the fuel in use;* Eliphalet Nott, Schenectady, New York, June 29.

CLAIM. "I therefore claim as my invention and improvement, the securing of the draft; the increasing of the conducting and radiating power of the flue, and the preventing of the speedy destruction of the flue itself, by making use of rough cast iron pipe combined as aforesaid, in the form of hollow parallelopipeds, in place of smooth sheet iron pipe, in the form of hollow cylinders, for so much thereof as it may be desirable to employ for giving off the requisite heat to the room; together with the uses to which the same has been, or may be hereafter, employed in stoves and furnaces."

This last concludes the series of nine patents appertaining particularly to the stove for the combustion of anthracite. Although we believe that there is, in most of them, sufficient novelty upon which to sustain a patent, we think, that as respects some of them, this point is, at least, a doubtful one; but the utility, merit, and originality of the stove into the composition of which they enter, does not depend upon this circumstance: this is a point which we believe the courts, and public opinion have both settled in favour of the patentee.

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35. For *Increasing the evolution of heat from anthracite coal, and for rendering the whole heat evolved from fuel of any sort, available to the production of useful effect in the treatment of bodies at rest;* Eliphalet Nott, Schenectady, New York, June 29.

(See specification)

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36. For improvements in the *treatment of metallic bodies, and of bodies generally, as well those that admit of motion while under treatment, as those that require to be at rest;* Eliphalet Nott, Schenectady, New York, June 29.

(See specification.)

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37. For a new *Apparatus for the Study of Astronomy;* James Swaim, city of Philadelphia, June 29.

This instrument consists of a hoop, or ring, something like the horizon of the artificial globe, being divided, like it, into twelve parts, for the signs, and each of them into thirty, for the degrees. The ring is to be placed vertically, upon a stand, and a wire is to rise from the stand, to its centre, bearing on it a small terrestrial globe. The divisions of the degrees are each to be perforated, to receive a pin, having attached to it a block representing one of the planets, which may be changed from one hole to another, according to the places of the planets in the eclipse. The hoop can be made to revolve round the ball, and this, we are told, represents exactly the apparent motion of the planets round the earth. If you suppose yourself at the top of the earth you are thereby to "tell at what o'clock any planet will rise, by observing where the sun is when the planet rises." The places of the planets may be found in almost any almanac.

This is the whole instrument, claim, invention, and discovery.

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38. For an *Inkstand;* Ezra Southworth, Saybrook, Middlesex county, Connecticut, June 29.

A phial is to be let into a piece of wood, where it is to be surrounded by cotton, or some other soft substance, calculated to keep it from breaking, and from freezing; this being fixed you are to plug up the hole with a piece of wood; then "varnish and bronze it, and you have an elegant and useful, and durable, ink stand, better than has heretofore been used."

"The setting the phials in wood, and securing them from breaking or freezing, by means of cotton, wool, flax, hemp, charcoal, or any other material which has that tendency, I claim as an entirely new improvement in the making of inkstands." The employment of cork has been very conveniently omitted, for although better than most of the articles named, it has been long known and used.

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39. For a *Mode of Raising and Lowering Tide and Current Water Wheels;* Charles F. Paine, Winslow, Kennebeck county, Maine, June 29.

The apparatus which is described is of a character rather more complex than appears to us to be necessary for the object in view, more so, in fact, than many which we have seen. The frame work which sustains the wheel is to project over a wharf, or other suitable place on the shore. The wheel is to run at the extreme ends of two vibrating beams, which are hung upon their centres; the interior extremity of these beams is capable of being raised or lowered by the machinery described. Upon one side of the water wheel there is a toothed rim which takes into a toothed wheel having its axis on the frame, and this, in its turn, into one whose axis is on the centre, or fulcrum, of the frame, from which last axle motion is to be communicated to machinery by means of whirls and bands.

The claim is, very properly, made to the particular combination and arrangement of the parts described and employed by the patentee.

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40. For an improvement in the *Gun;* David G. Colburn, Canton, Onondagua county, New York, June 29.

This is to be a magazine gun, to fire from three to twelve times after being once loaded. There is to be a cylindrical magazine revolving on an arbor, and containing the required number of charges. The lock is to be so constructed that it will turn the magazine, and prime itself at the same time by pulling the trigger. The description of the apparatus is extremely obscure, and were we to contrive to pick out the parts which are represented in the drawing, so as to understand their uses, we should be unable to communicate the knowledge so acquired; and were we able to do so, the information afforded would, we apprehend, be of very little value, because we do not think the thing itself will ever come into use, nor, if brought into use, do we believe that it would much outlive an ephemeron. The claim is to all the parts employed in the lock for cocking, priming, and turning the magazine.

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41. For a *Thrashing Machine;* Daniel A. Webster, city of New York, June 29.

The part of the cylinder, usually called the beaters, differs essentially from those used in any of the numerous thrashing machines which have preceded it; at least so far as our knowledge extends, and we have been introduced to a host of them.

The rims or heads, which form the ends of the cylinder, carry four fluted rollers, extending from one to the other, having their axes on the peripheries of the heads, and the flutes straight, from one end to the other of the rollers.

The concave segment is formed of small rollers, or reeds, extended across it, and corresponding in size with the flutes upon the beater rollers. There is to be a space of about half an inch between the flutes and the reeds on the concave, thus allowing room for the straw to pass; the numerous flexures of which, in its passage, will, it is said, thrash or clean out the grain, whilst the motion of the rollers upon their axes in a direction the reverse of that of the cylinder, will allow the latter to revolve under less obstruction than usual. The invention, as claimed, consists in this construction of the cylinder and concave.

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42. For an improvement in roads, denominated the *Track Road;* John S. Williams, Cincinnati, Hamilton county, Ohio, June 29.

(See specification.)

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43. For the application to machinery of the *Power resulting from Explosive Compounds;* Henry Rodgers, New York, June 29.

The patentee boldly claims as what "he intends to patent, *the application of the power produced by the explosion of gunpowder or any other explosive compound, to machinery in general, whether in the form described or in any other that may suit better,*" and he then informs us that he intends to apply the power more especially to locomotive engines, and carriages to run upon common roads.

Although the whole specification consists of a description of the particular apparatus which is represented in a drawing, we do not think it necessary to follow this description, as the patentee does not himself claim the machine, but the *principle* of using expansive compounds in any way. As regards the machine we will merely observe that it contains a piston within a cylinder, which is to be forced up by the explosion of gunpowder, ignited by means of a hammer striking upon percussion powder.

Putting out of the question the schemes for perpetual motion, we could not call to our recollection a patent more essentially deficient both in form and substance than the one before us. In the first place the patent is taken for a naked principle, independently of any practical mode of applying it, which is not in itself patentable. In the next place, the idea of employing this principle has not the shadow of a claim to novelty; many essays have been made to employ the explosive force of gunpowder to the propelling of machinery, and after the expenditure of large sums of money, it has been abandoned as hopeless. As regards other explosive compounds, which are all embraced in the sweeping claims of the patentee, the records of the patent office both here and in Europe, might have admonished the present appli-

cant of the futility of such a claim. Brown's gas engine in England, and Capt. Morey's explosive engine, patented both there and in this country, are among the examples. The editor assisted in the performance of a number of experiments of the same kind, upwards of twenty years ago; and twenty years hence, when the present attempt shall have been long forgotten, the same phantom will again arise, and lead astray some new seeker after *unthought of* modes of driving machinery.

We are not prepared to say that there is not in nature any power better than that of steam, because we believe that our knowledge of the laws of nature, and the resources of art in applying them, will always be progressive; but we are fully convinced that this better power will not be the result of the firing of gunpowder, or of any other *explosive* mixture by which sudden and intermitting effects are produced.

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44. For a *Thrashing and Hulling Machine;* James Pearson, jr., Rush, Northumberland county, Pennsylvania, June 29.

The teeth on the cylinder, and on the concave are to be of cast iron. The concave is to consist of segments of cast iron rims, having teeth, or ledges on each side of them. These segments are to be placed parallel to each other, and at such a distance apart as shall allow long cast iron teeth, forming regular rows around the cylinder, to pass between them. The claim is to the mode of forming the cylinder and concave.

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45. For a *Fire Proof Soap Clay Covering for Roofs;* Hezekiah Steel, Hudson, Columbia county, New York, June 29.

Sheathing paper is to be saturated by placing it in a boiling hot mixture of rosin, tar, and whale oil, after which it is to be passed between rollers to force off the redundant material from the surface. A kind of soap stone clay, found in Hempstead Harbour, on Long Island, is to be ground with oil in the manner of paint, and then laid on the paper to the thickness of an eighth of an inch. This being left to dry for five days, will, according to the averments of the patentee, become hard, impervious to water, and entirely fire proof. The composition may, it is said, be applied like paint to a shingled roof, which will be thereby rendered fire proof.

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46. For *Forging Axes by Rolling;* Erastus Shaw, Canton, Hartford county, Connecticut, June 29.

The rolling machine is to be made with a frame like that of the common flatting mill, but the rollers are to project *outside* of the frame at one end, and this instead of the portion between the two ends of the frame, is to be the operating part. Holes, or recesses, are to be formed in these projecting ends to receive dies, or swages of any form that may be wanted.

The claim made is to "the application of rollers placed on the *outside* of the frame to the forging of axes of all kinds."

At p. 240, vol. xi. we have published Mr. Asahel Collins' specification of a patent for the same purpose, and although he does not propose to do his rolling on the *outside*, but between the standards in the part ordinarily used, his plan is the same with the foregoing in all its essential particulars. If Mr. Collins' patent is good, it is not to be got rid of, or evaded, by an alteration, the only object of which appears to be, to effect this purpose, as the contrivance is without the slightest claim to invention or discovery; an invasion against which the law has absolutely provided, and which no court of *justice* would sanction, were no such provision made.

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47. For an improvement in *Locks for Doors;* William How, city of New York, June 29.

This lock is to be made in most respects like the common door lock, but there are to be five, or any other number, of cylindrical pieces, which are called drums, ranged on the side of the bolt, and made in such a way that excepting they are all placed in the proper direction the bolt cannot be turned by the key. The drums may be of brass, about one inch in diameter, and three-eighths of an inch thick: a spindle passes through each of them to retain them in their places, and to receive the pipe of a key by which they are to be turned. They have each of them a groove on one edge to admit a wing projecting from the bolt to pass through, when rightly placed for that purpose, but they stop its motion when not so placed. The door must have a round key hole for each of these drums, in order to their being turned in the proper position preparatory to unlocking the door with the ordinary key. When unlocked, pieces projecting from the bolt cover the ends of the pins by which the drums are to be turned.

The point claimed is "the movable indices applied to door and other locks as above specified."

We do not perceive the superiority of this lock to many others which have been devised for special security, and we think that the adjustment of the five drums will exact more attention than most persons will be willing to give, excepting during the period when they are satisfying their curiosity concerning them.

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48. For an improvement in the *Distillery;* Henry Beeker, Warwick, Lancaster county, Pennsylvania, June 29.

These improvements consist of such arrangements of the apparatus for distilling as it is supposed will economise fuel, by a more advantageous application of the heat than usual: the patentee says that by his mode of procedure one-third of the fuel ordinarily consumed, is saved. We cannot describe the whole of the proposed arrangements, several of which are without novelty, and as there is no claim made we cannot tell what it was intended to patent. The principal point in the arrangement appears to be the making a very long neck to the still, and the surrounding this by a tub to contain beer, which becomes heated both by the neck, and by steam tubes which pass from the still into the beer. A tube from the tub, or boiler, allows the beer, when ne-

cessary, to descend into the still, but before this takes place the spirit will, it is said, be half driven off, from it, by the heat which it has received.

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49. For a *Machine for Planting and Digging Potatoes;* Levi Rice, Robbinstown, Washington county, Maine, June 29.

Various uses are named to which this machine in question is to be applied, as, to furrowing, dropping, and covering, potatoes; digging them, and excavating the earth. It does not appear, however, that the machine, as represented, is calculated to produce all these effects; and the only claim made by the patentee is "the right of improvement of putting more wheels to the machine, and furrowing, dropping, and covering potatoes, and also for digging potatoes, and excavating the earth." Perhaps, however, we mistake the design of this claim, and that it is intended to use the machine for all these purposes in the form in which it is represented in the drawing; if so, like many others, it claims more than it appears calculated to accomplish.

A sort of frame is made, consisting of two side pieces, united to end pieces: this is to be drawn by one end, and near to the other it has two low wheels, connected by a revolving axle, and having spikes on them to enable them to take hold of the ground. On the axle is a roller, and near the front end of the machine, another, around which passes a revolving apron, consisting of parallel bars crossing the frame, and, we suppose, placed so near together that potatoes will not pass between them. At the front end there is a shovel, which may be depressed by raising levers: this shovels up the potatoes, and earth, and conducts them on to the revolving apron, in passing over which the earth is to be shaken out, and the potatoes are to fall into a box in the rear. Under the machine a share projects down for making a furrow, and behind it are two scrapers for covering this furrow with earth; of what use these appendages can be it is hard to tell, as there is no contrivance for dropping potatoes, or any thing else, into the furrow; this part, however, will probably be developed by the time the machine has arrived at maturity, as at present, this and other parts exist in embryo only, if at all.

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50. For an *Elevator Bucket;* Nelson C. Staples, Lynchburg, Campbell county, Virginia, June 29.

This bucket, which is to be substituted for those now in use in the elevators of flour mills, is to have ends of wood, about an inch thick, with their upper ends bevelled off to conduct the grain into the bucket. The remaining part is of sheet iron, and a bolt extends from one end to the other, in front of the sheet iron, and through the wooden ends, to confine them together. The buckets are to be attached to the strap by two strong screws.

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51. For a *Planting Machine, for making a ridge, opening it, and dropping cotton or other seeds;* John J. Goodman, and William S. M'Donald, Wilson county, Tennessee, June 29.

There is no small resemblance between this planting machine and several others which have preceded it, and there is not any thing in the specification setting forth the improvement supposed to be made. The ground is to be opened by a share; the seed is dropped from a hopper, the quantity discharged being governed by the motion of the wheels; and a contrivance in the rear of the machine is intended to close the ground over the seed. All these objects have been previously accomplished by contrivances very similar to those described by the patentees, who should, therefore, have shown clearly the points of novelty in their arrangement.

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52. For a mode of *Manufacturing Hose for the conveyance of Water, and for foundations of Machine Cards;* Samuel D. Breed, city of Philadelphia, June 29.

(See specification.)

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53. For a *Machine for Sawing Round Bodies from Logs, for Cooper's Ware, &c.;* Samuel Newton, Hamilton county, Ohio, June 29.

With a manifest intention of giving a full and exact description of this machine, it is rendered complex and obscure by a too precise designation of the size of the various timbers used, and the manner of framing them together. And although this description is accompanied by a very good drawing, there are no references whatever to it; it is no easy task, therefore, to connect the description with the thing described. We collect, however, from the whole, that the object is to saw out rims for cooper's work, of that kind which is not bulging, such as tubs, buckets, piggins, &c. The blocks from which they are to be sawed is round timber, which is to be centered, and fixed in the machine. A groove is to be cut into the block from end to end, reaching as near as may be to the centre, and of sufficient width to admit the saw, which must be made as narrow as it can be with convenience. The saw is worked by a crank motion, and the block regularly turned round by the machinery. The vessels are thus sawed one out of the other, and the opening closed by hooping. A vessel is thus formed which may be said to consist of a single stave, there being but one joint in the body of it.

The claim is to "the application of known principles in their combination. adaptation, and application, to the above purpose of making cooper's ware, or the bodies thereof, by the application of the saw in the groove of the round log, by which vessels may be formed with an opening in the side."

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54. For a *New manufacture of Wheels for Rail-road Cars;* Matthias W. Baldwin, city of Philadelphia, June 29.

(See specification.)

55. For an improvement in *Road Making;* John Hartman, Scottsville, Albemarle county, Virginia, June 29.

Logs are to be taken, and halved by sawing, or otherwise; or a sufficient portion may be hewed off from one side to give the required surface. These are to be laid lengthwise on the road, at such distance apart as shall correspond with the ordinary length of the axles of carriages. They may be notched into cross sills, and braced or fixed in various ways. Scantling may be bolted, nailed, or pinned, on either edge, or on both edges, of these rails, to keep the wheels on them.

"Any, or all, of these timbers may be put down with the bark on, or taken off by hewing, sawing, shaving, or burning; the latter of which is particularly intended, as adapted to last. This road is intended for all sorts of wagons, carriages, stages, &c. either drawn by horses, or propelled by steam; also for horses, cattle, &c., to be used up and down hills."

Such is the description of this invention, no part of which is claimed. Among the specifications for this month will be found one of a patent to John S. Williams, of Ohio, for a similar thing. The patents both bear the same date, but this does not determine the question of who is the *first inventor.* How long since Mr. Hartman devised and completed his plan, we have no means of knowing, but we have been for more than two years past in correspondence with Mr. Williams upon this subject; if the plans are, therefore, identical in principle, as we believe them to be, Mr. Hartman must be able to prove a date to his invention some considerable time back, or the ground he has occupied will be found subject to a prior claim.

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56. For improvements in the *Reacting Water Wheel;* John Ambler, Jr., Waterford, Saratoga county, New York. First patented February 2nd, 1833. Patent surrendered and reissued on an amended specification. June 29.

The former specification was extremely indistinct, leaving it at least very uncertain in what the improvement consisted; and as the kind of wheel intended to be patented cannot itself be claimed as new, the validity of any claim which includes the employment of it must depend upon its being confined to such improvements as are particularly designated. The general construction of the wheel is similar to that described in the patent of Mr. Wing, of which we have frequently spoken. The heads and buckets are to be cast in separate pieces, and screwed together by bolts which pass though the heads, and the body of each bucket. The buckets are cast thicker in the middle than elsewhere, something like the sketch in the margin, the white part being hollow, and the dark spot showing the bolt which passes throught it. One of the outer curves is adapted to the rim of the wheel, the other bending in to form the opening for the discharge of water. The inner curve is a regular segment of a circle. The projecting rim which rises from the upper head, surrounding the hole for the admission of water, and

connecting the wheel with the flume, is cast in a separate piece, and is bolted to the head, through a flanch. The design of this is to allow of its being truly centered without the labour of turning it. This rim comes up close to the bottom of the flume, the hole in the lower end of which is of the same diameter with the interior of the rim. A hoop of leather is fastened round within the opening in the flume, by means of a rim, or hoop, of sheet iron; the leather descends below this, and into the rim of the wheel, where it operates as a valve; the water in the flume pressing upon it always keeps it in contact, whilst the wheel can still turn easily.

There is a gate to regulate, or to prevent, the admission of water into the wheel. This consists of a cylindrical tube open at both ends, its outside fitting to, and sliding vertically within, the opening in the flume and head of the wheel. When this tube is let down so as to come into contact with the lower head, the water can no longer find its way to the buckets; but when raised, it may flow more or less freely to them, in proportion to its elevation.

The improvements claimed are "the form of the bucket as above described; the method of securing the joint between the wheel and the flume by means of a movable rim, and sheet iron and leather, in the manner hereinbefore described; and the cylindrical gate, or tube, as above described."

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a patent for a mode of manufacturing Wood Screws; HAZARD KNOWLES, *Colchester, New London county, Connecticut. First patented April* 1, 1831. *Patent surrendered, and reissued on an amended specification March* 1, 1833.

To all to whom these presents may come, be it known, that I, Hazard Knowles, of Colchester, in the county of New London, in the state of Connecticut, have invented a new and useful improvement in the mode of manufacturing wood screws, of which the following is a full and exact description. The improvement which I have invented consists in the method of raising, or producing, the *thread* of the screw, which is done, not upon the principle of cutting out or removing the metal of the wire, or cylinder, upon which the thread is to be produced, so as to leave it standing in relief by means of a file, or any kind of edge tool whatever, but upon the principle of forcing the metal aside and driving up so as to constitute the spiral thread; and this is done by subjecting the wire or metal cylinder, upon which the thread is to be produced to pressure, while revolving between two oblong plates, or dies, of tempered steel, which are made to pass over, or by, each other in parallel lines, and of which each one has its face grooved or creased, in such a manner as to correspond with, and form a counter part to, the other, and so as to regulate and produce the thread upon the wire or metal cylinder as it is compressed between them, and made to revolve by their motion.

The grooved plates above mentioned may be of any thickness that will allow a crease or groove of sufficient depth to form the desired thread, and each plate may be welded, or otherwise fastened, to a bed or basis of iron, or other metal, which must be massive enough to sustain any degree of pressure that may be required in order to raise the thread, and they should be so long as to allow as many revolutions of the wire or cylinder between them as may be necessary to force up the thread to the desired sharpness and smoothness, and they must be of a width that shall at least equal the length of that part of the metal which is to receive the thread, the extent to which the wire is admitted between the plates being determined by experience, and adjusted, or gauged, by means of a set screw.

Both these plates, or dies, may move, or one may be kept in motion and the other at rest. They may be attached to, or connected with, any machine that is capable of producing the motion, and of sustaining the requisite pressure, and the motion may be given by a crank, or a cam, at pleasure, the plates being suspended or carried by any kind of bed, or carriage, traversing upon rails, or between ways; or, finally, one of the plates may be made convex and the other concave, and one of them may be attached to the periphery of a wheel, the other remaining at rest either above or below it, and the pressure being produced by a slight difference between the convexity of the one, and the concavity of the other, or by a little eccentricity of the winch upon which one rests and the other moves.

I prefer, and use, the reciprocating motion produced by a cam either in one or in both of the plates, and these I sometimes drive one over the other in a horizontal motion, the cylinder, or wire, laying horizontally, revolving between them, and sometimes one by the side of the other, the cylinder standing perpendicular as it revolves. The constructor may arrange them in such relative position as he may prefer.

Annexed is a drawing of *one* of the plates, or dies, the lines representing the ridges between the grooves or creases. These will always run obliquely, and for right hand screws they must rise as they run from right to left, the angle at the bottom being greater or less, and the lines themselves being more or less near to each other, always being exactly parallel, according to the size of the cylinder and the fineness of the thread, the angle increasing as the thread increases in its gain and its size.

The grooves or creases in the face of each die must, of course, be deep, and the ridges between them sharp, according to the desired depth and sharpness of the thread; and one or both of the dies or plates must be so constructed that their faces shall gradually come to each other as the cylinder is carried between them, till it has reached about the middle of the plates, and from that point that their faces shall be parallel to each other during the rest of their motion, their motion being always in right lines, and the sides of the dies that correspond to each other, always moving upon the same line or upon parallel lines.

From about the middle of the plate, measuring from end to end,

the ridges between the grooves gradually become wider at the top, and the grooves more sharp at the bottom in order to leave the spaces between the threads of the screws broad at the bottom, and the threads themselves thin and sharp at the top, if it is desired to give the screw that form or curvature, and small transverse cuts run across the ridges, at right angles with the sides of the die, and quite near to each other, in order to prevent the cylinder from sliding between the dies, and to give it a revolving motion.

The plates, or dies, may be so arranged as to thread or form a screw in their motion either from right to left, or from left to right, or in each part of their reciprocating motion. The wire, or cylinder, is introduced at, or near, the end of one of the dies, and is seized by the other as it passes, and driven out at the other end, the screw being threaded or formed with entire accuracy, and with a degree of perfection that will always correspond with the fineness of the metal and the workmanship of the machinery.

What I claim as my invention, and for the use of which I ask an exclusive privilege, is the improvement in the mode of manufacturing the wood screw, which consists in the method of raising or producing the thread, by forcing up the metal of the cylinder, or wire, of which the screw is made, so as to constitute the thread by rolling and compressing the cylinder between grooved plates, or dies, of the foregoing description, by whatever machinery the dies are worked, and in whatever way the motion is given, or the pressure applied.

HAZARD KNOWLES.

Specification of a patent for an improvement in the Construction of Roads, whereby some of the advantages derived from rail-roads are extended to common carriages of burthen or pleasure. Granted to JOHN S. WILLIAMS, *Cincinnati, Hamilton county, Ohio, June* 29, 1833.

I lay two continuous lines of timber, or other suitable material, lengthwise, on said road, at such a distance apart as to form tracks for the wheels of such vehicles as are in general use upon the road so improved. I furrow, gutter, or groove, one of these tracks, in order to receive and guide the wheel, or wheels, on one side of the carriages travelling thereon. Those grooves, or gutters, may be made in the timber, or other material, before it is laid upon the road, or afterwards, either by hand or by machinery propelled by any suitable motive power, or they may be formed by attaching cheeks, or sides, to a plain surface.

The other track ought to be laid on a level with the bottom of the furrow, or gutter, above mentioned. Its face I make plain, and it ought to be of such a width as to allow for the variation of span sometimes given to the wheels of different kinds of carriages in some places, so that while the wheels of one side of the vehicles shall remain within the groove of one track, the other wheel shall remain on the face of

the other track, notwithstanding the different spans to which they may be constructed.

These tracks may be bedded, or laid, in, or upon, stone, gravel, clay, or any material of which the surface of the road is formed, and the piece of which they are constructed, may be connected by dowels, or clamps, or laid upon transverse blocks, or cross pieces, which may, or may not, extend from one to the other.

Scrapers may be attached to some of the carriages passing on said tracks for the purpose of cleansing them of stones, earth, or other matter, which might tend to obstruct the wheels, or injure the tracks.

Where there is much travelling upon a road so improved, I lay two sets, or four continuous lines, of tracks, one set for the going, and one for the returning carriages. This will be found most convenient; although to turn out of the tracks, when carriages meet, will not be attended with difficulty, as one side only of the turning out carriage would have to be raised over a small obstacle.

I am aware that some of the advantages of such a track road may be gained by laying timber, &c. as above, and by furrowing, guttering, or rebating, both tracks to guide the wheels, but I prefer to gutter, or groove, one only.

What I claim as my invention or improvement, is the laying of tracks of wood, or other suitable material, one of which shall be furrowed, grooved, or guttered, in the manner, and for the purpose, hereinbefore set forth.

John S. Williams.

Specification of a patent for an improvement in the Chimney Cap for increasing the draft in the Furnaces of Steam-boats, and Locomotive Engines. Granted to James P. Espy, *city of Philadelphia, June* 29, 1833.

To all to whom these presents shall come, be it known, that I, James P. Espy, of the city of Philadelphia, and state of Pennsylvania, have invented a new and useful improvement, which I call a draft generating chimney cap. for increasing the draft in the furnaces of locomotive engines and steam-boats, and for preventing the emission of sparks from their chimnies, and that the following is a full and exact description of the construction, application, and operation, of the said draft generating chimney cap, as applied to the above purposes by me. The drawing and model deposited in the patent office, represent a portion of the upper part of the chimney with the cap surrounding it, connected with a vane which may be either above or below, provided it is long enough to turn the angle of the cap always to the wind. This angle, it is believed, may vary from fifty to ninety degrees without materially varying the effect, whilst the angle of the upper covering of the cap, which slopes upwards from the wind, should be from forty to sixty with the horizon.

As the object is to produce a partial vacuum over the top of the

chimney, when the locomotive, or steam-boat, is in motion, it is manifest that the draft will be increased by enlarging the cap, both because the vacuum will be greater, and a freer egress will be allowed to gas from the chimney; and on this account particular care must be taken to have the upper covering of the cap so high above the top of the chimney as to allow a very free egress of the smoke from the chimney into the cap. In the cap which I have had made to test the theory by experiment, and which has been completely successful, a wire gauze so fine that a pin's head can hardly be thrust through the meshes, has been used, it is about thirteen or fourteen times the area of the top of the chimney, and thus affords a very free egress to the gases, whilst it completely stops the sparks. When it is in its place on the chimney the wire gauze stands perpendicular to the horizon, and the sparks after striking against it, finally fall down, and nearly leave the passage free. And it is hoped that, by making a few small holes in the lower plate of the cap, near the wire, to admit a small portion of atmospheric air, these sparks will burn, and thus save the trouble of cleaning out the cap by hand.

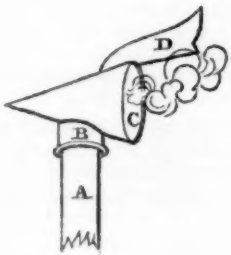
The cap should be so nicely balanced as to turn freely to the wind; at the same time it should fit so closely to the chimney as to let in as little air as possible into the cap, for every particle which thus enters diminishes the draft.

The cap itself is made of sheet iron, and the lower plate which goes round the chimney, and fits close to it, is horizontal, in the experiment model, and in the model deposited in the patent office; but any intelligent mechanic, who understands the operation of the machine in causing a partial vacuum, will easily know how to vary the proportions of the cap, without materially injuring the effect.

Where draft only is required, it may be made very strong by not using the wire.

What I claim as new in the above arrangement, is the application of a machine, which I call a draft generating chimney cap, to the top of chimnies in steam-boats and locomotive engines, to increase the draft by causing a partial vacuum over the top of the chimney, and thus permitting the use of a wire gauze to prevent the emission of sparks without materially diminishing the draft.

James P. Espy.



A, The chimney.

B, Neck of the cap.

C, Opening of the cap.

D, Vane.

Mr. Espy has received the following certificates of the entire success of his invention, and he feels satisfied that the most decided advantage will result from the adoption of it, not only by locomotives, but by steam-boats incommoded by ordinary sparks, and not having draft enough to bear a wire gauze at the top of the smoke pipe; for the draft cap and its wire gauze the draft will be much greater than their present smoke pipes afford. Mr. Espy will receive communications on the subject (post paid) at Philadelphia.

This is to certify that I have tried Mr. Espy's draft cap, on Mr. Baldwin's locomotive engine [on the Philadelphia and Germantown rail-road,] and that with a wire gauze so fine that the head of a pin could not go through the meshes, which was quite too fine; it effectually stopped the sparks, without diminishing the draft, and in some cases it even increased it, as, by opening the door to put in wood, the flame did not come out as it did previously in similar circumstances.

In short, it is the only machine which I think will completely answer the purpose of stopping the sparks, without diminishing the draft, that has yet been presented to the public.

October 7th, 1833. Wm. Knight, *Engineer.*

The cap has also been tried on a steam-boat which burns anthracite coal, and the following certificate of the decidedly good effect which it produces not only in insuring a great draft, but in saving fuel by burning the carbonic oxide under the boiler, which, without the cap, was burned above the top of the smoke pipe.

This is to certify that I have had in use Mr. Espy's draft cap on the steam-boat Convoy, for several months. This boat burns anthracite, and since the cap has been put on, nearly one-third of the coal we used to burn has been saved, and we make our trips in a fourth less time. The draft is very much increased, especially when we go against the wind, and the flame which always used to appear in the night rising above the top of the smoke pipe, eight or nine feet, has never but once appeared since the cap has been put on—and the smoke pipe which used to be red hot to the top, is not now red more than three or four feet from the bottom. Attention to the fires is also attended with less trouble than formerly; for previous to the use of the cap, we had to fill up with coal every ten miles, now we fill up only every seventeen miles, and as we always fill up to within four inches of the top of the grate, and carefully level, the quantity of coal used is known by actual experiment.

I may add that the steam is sooner got up at the wharf when there is any wind, and I know of no disadvantage attending the use of the cap, if it is well made, so as to turn freely to the wind.

James Devoes, *Engineer.*

Philadelphia, October 5th, 1833.

To this may be added the certificate of Joseph Watson, former mayor of the city of Philadelphia.

James Devoes, whose name is subscribed to the above certificate, has long been employed by the Lehigh Coal and Navigation Company, as an engineer, on board the steam-boat Convoy. He was regularly brought up to the business of making steam engines, and when a boy received from the Franklin Institute, a premium for his ingenuity and workmanship in the production of a small steam engine. I have great confidence in his ability and judgment, and believe that his certificate deserves entire credit.

JOSEPH WATSON, *President.*

Remarks by the Patentee.

The cap described in the patent is pyramidal, but as an equal vacuum will be formed whether a pyramid or a cone is employed, and as it has been found by experiment, since the patent was taken out, that a cone is a little stiffer than a pyramid, it is recommended in preference, and accordingly exhibited in the drawing.

The proportions given in this drawing are believed to be good, but they may vary considerably without materially injuring the effect. In these, the diameter of the smoke pipe is one, the mouth of the cap, or base of the cone, two, and the axis of the cone, three. Any one may easily satisfy himself of the effect of the vacuum produced by the operation of the cap, by making one of paste-board of the size of the drawing, and inserting a tube in the side of it; then by holding the end of this tube near the flame of a candle, and blowing on the vertex of the cone, he will see the flame of the candle rush with great velocity into the end of the tube. Indeed the velocity with which it rushes into the tube is greater than the velocity of the air passing the apex of the cone. For it is known by experiment that if the wind be made to blow against the mouth of the cap, that the air will blow down the tube with a greater velocity than the air has which meets the cap. And when the wind blows against the apex, it is believed that the effect is nearly reversed. This point, however, shall be determined by experiment, and the result laid before the public, with any other information on the subject which may be obtained in the progress of the investigation.

Specification of a patent for increasing the Evolution of Heat from Anthracite Coal, and for rendering the whole of the heat evolved from fuel of any sort, available to the production of useful effect, in the treatment of bodies at rest. Granted to ELIPHALET NOTT, *Schenectady, New York, June* 29, 1833.

It having been discovered that the heat of an anthracite coal fire may be increased by more fully igniting its contained hydrogen; and it having also been discovered that the heat of a fire of any sort may be advantageously applied successively to the treatment of successive bodies; certain improvements have therefore been made for carrying the same into effect; which consist, in providing for the more com-

plete combustion of the hydrogen produced in the use of anthracite coal; and in concentrating several processes to which the heat produced in the use of fuel of any sort can be conveniently applied;—always beginning with a process that requires a high temperature, as the reduction of ore, and the manufacture of metals, or the subsequent melting or heating thereof, for the purpose of being cast or wrought into other forms; and proceeding thereafter to processes requiring a lower temperature, as iron to be annealed, or pit coal, or rosin, to be decomposed for the production of gas: by interposing between a cupola, forge, furnace, or chamber of combustion and a boiler, or a chimney if no boiler be in use, an elongated chamber of treatment, of nonconducting material, either vertical, inclined, or horizontal; or in part the one, and in part the other; the same being exhibited either in a single channel, having, when required, recesses formed along the line thereof, that certain bodies, or bodies in certain localities, can be placed more or less out of the main current of the contained flame; and having also inspecting apertures, and apertures for the ingress and egress of bodies, or for the admission of air for the cooling of the interior, or the ignition of the contained hydrogen, all governed by valves:—or the same, or some part thereof, being exhibited in two or more channels, placed side by side, or one above the other, and so divided into compartments, and furnished with additional interior inlets and outlets governed by valves, that bodies under treatment can be passed from one end to the other, and that the flame can be passed in the one channel, or the other, and caused to bear with greater or less intensity on the bodies in any locality of either, or carried off from them all to the chimney through a separate flue governed by a valve: and in the keeping up the temperature along the line of said chamber of treatment after the process of melting in the cupola has ceased;—by converting a section of said chamber of treatment into an occasional chamber of combustion, and separating the same by a valve from the cupola, unless it be deemed preferable to make use of the cupola itself, in such case, as a mere chamber of combustion; and in causing the entire volume of flame, however divided in its passage, to bear upon the boiler, (if a boiler be employed,) which is always to be placed late, if not last, in the series of bodies to be treated, and the steam thereof, besides driving an engine employed in heating water to be used in other processes, as drying, bleaching, &c.: and in providing, adjoining the boiler, an auxiliary furnace, to be used when necessary; and in governing by valves the inlet to the boiler from the cupola, and the inlet to the furnace from the external air, so that when the flame from the cupola ceases, the inlet to the boiler may be closed; and when the flame from the cupola is sufficient for the boiler, the inlet to the furnace from the external air may be closed; unless when opened for igniting the hydrogen from the cupola, or for cooling the interior.

It is understood, that, when practicable, the air introduced for the ignition of gas, should be heated, by being passed between the crust of the fabric, and an exterior, or second crust, so enveloping the whole as to form an air chamber. And it also being understood that

a double arrangement is to be preferred, so that as one apparatus is repairing, the other may be in use.

For further information reference must be had to the drawings hereunto annexed.

[The specification next contains a "summary" of the improvements, in which the foregoing is recapitulated, but somewhat condensed; this part we omit, and proceed to the claim, which varies but little from the summary.]

I therefore claim as my invention and improvement, the invention of the increasing of the evolution of heat in the use of anthracite coal, and the rendering the entire heat evolved in the use of fuel of any sort available to the production of useful effects, by concentrating and arranging in the order aforesaid, the several processes to which the said heat can be conveniently applied in the treatment of successive bodies, or of bodies divided into successive portions at rest; by interposing between a cupola, forge, or furnace, a chamber of combustion and a boiler, or a chimney if no boiler be in use, an intermediate chamber of treatment, exhibited and furnished as aforesaid, or exhibited and furnished in any other manner, provided adequate provision be made thereby for the ignition of the hydrogen of anthracite, and for rendering the entire heat from fuel of any sort productive of useful effect, by applying the same successively to such several processes as can be conveniently carried forward by the treatment of successive bodies at rest.—Also the preventing the injurious effects of the flame of a cupola upon a boiler in contact therewith; and the diminishing of the reduction of the temperature to which it is exposed while charging the cupola, by the removal of the same to a distance therefrom. Also the protecting of the boiler, however situated, against the action of the flame of a cupola, when too intense, by passing off a portion of the heat thereof through a separate flue governed by a valve: and also the governing of the inlet to a boiler from a cupola, by a valve; and the furnishing of a boiler by means of an auxiliary furnace, with the requisite heat when the cupola is not in blast, or when the heat thereof is insufficient, together with the uses to which the same has been, or may hereafter be, applied.

ELIPHALET NOTT.

Specification of a patent for improvements made in the treatment of metallic bodies generally; as well those that admit of motion while under treatment, as those which require to be at rest. Granted to ELIPHALET NOTT, *Schenectady, New York, June* 29, 1833.

It having been discovered that metallic bodies oxidize less when exposed to the action of the products of combustion, than when exposed to the action of the elements of combustion; and it also having been discovered that contiguous bodies at different temperatures, and

moving in opposite directions, exchange temperatures, therefore certain improvements for carrying these discoveries into effect have been made: which improvements consist;—In preventing the oxidizing of metallic bodies by treating the same in all cases in a chamber separate from the chamber of combustion: and in economising the expenditure of heat generally by concentrating the processes to which the same can be conveniently applied;—and in arranging the whole in a series according to the degree of temperature required in each, always proceeding from the greater to the less, and in dividing the material to be treated into portions, and arranging the same in successive localities, and in passing the same (so far as they admit of being moved from one compartment to another) towards the chamber of treatment along the same channel through which the flame is caused to escape therefrom, and to act as it escapes on successive bodies under treatment, till the whole available temperature has been expended before the same enters the chimney; all of which is effected either by means of a vertical reverberatory, or zig zag chamber of treatment, consisting of a series of compartments separated by solid and fixed floors, more or less inclined and arranged one above another, and furnished with appropriate rests or ways, for sustaining incumbent bodies under treatment, and for passing the same down to the next locality when treated; and furnished also with apertures for inspection, and for the ingress and egress of bodies, and the introduction of the requisite instruments for adjusting and removing the same—or by means of a vertical, reverberatory chamber of treatment, consisting, in like manner, in a series of compartments arranged one above another, and separated by floors in part solid and fixed, and in part open and movable, either by levers, or eccentric axes, piercing the crust and worked from without, in such manner, that the contents of each superior compartment can at pleasure be passed down into the next inferior compartment;—or by means of a vertical chamber of treatment without reverberations, consisting in like manner of a series of compartments arranged one above another and separated by floors, more or less open, and wholly movable, either by eccentric or by central axes, piercing the crust, and worked as aforesaid, from without, in such manner that the contents of each superior compartment can be emptied by a revolution of its floor into the compartment under it:—which several chambers of treatment must be connected, each at its lower extremity, with the outlet for flame from the chamber of combustion;—or with the outlet for flame from a cupola, having an inlet for flame thereto from a separate chamber of combustion; or with a cupola, or other furnace, constructed in the usual manner: and each must also be connected at its upper extremity with an additional section of a horizontal chamber of treatment exhibited in one or more channels for the application of the surplus heat in the treatment of additional bodies requiring lower temperatures, as pit coal and rosin contained in retorts for the production of gas: and water in boilers for the generation of steam, to be employed for driving an engine, and thereafter for heating additional water for drying, bleaching, or any other process.

For further information reference must be had to the drawings and explanations deposited in the patent office.

[Summary.]

I therefore claim as my invention and improvement the diminishing of the oxidizing of metallic bodies, by treating them, whether in cupolas, forges, or other furnaces, in a chamber distinct from the chamber of combustion;—and the economising of the expenditure of heat in the treatment of bodies generally, by concentrating all the processes to which the same heat can conveniently be applied, and arranging the order thereof according to the intensity of the temperature required by each;—and the dividing of the bodies to be treated, exclusive of those contained in the cupola, forge, or other furnace, into portions, and arranging the same successively, in successive localities, and of moving the bodies that admit of motion which are under treatment, towards the chamber of combustion, along the same channel through which the flame is passing off from said chamber in an opposite direction; always putting the new material into the locality further from the chamber of combustion, and removing the material sufficiently treated, from the locality nearest the chamber of combustion, by means of a special chamber of treatment, constructed, connected, and managed, as already described; the same being interposed between a cupola, forge, or other furnace, and the boiler, or the chimney, if no boiler be in use; or by any other means, provided the chamber of treatment be separated from the chamber of combustion throughout; and provided the different processes to which the same heat can be applied be concentrated, and the succession ordered according to the degree of temperature required by each; and provided also, the material to be treated be divided into parcels arranged in successive localities; and, if capable of motion, be moved in one direction towards the chamber of combustion along the same channel through which the flame is passing from the chamber of combustion in an opposite direction; together with the uses to which the same has been, or may hereafter be, applied, in the reduction of ores, the manufacture of iron, or other metals, the melting, or heating, of the same, to be cast, or wrought, into different forms, together with the other processes of art, with which the same may be combined.

ELIPHALET NOTT.

Specification of a patent for a new manufacture of Wheels for Locomotive Engines and Cars, to run upon Rail-roads. Granted to MATTHIAS W. BALDWIN, *city of Philadelphia, June* 29, 1833.

To all whom it may concern, be it known, that I, Matthias W. Baldwin, of the city of Philadelphia, have invented a new and useful manufacture of wheels for locomotive engines and cars, to run upon rail-roads, and that the following is a full and exact description of my said invention.

Instead of making the wheels for the carriages of locomotive engines, and of other cars, or carriages, to be used upon rail-roads, of cast iron, or of a combination of cast and wrought iron, or of wood combined with cast or wrought iron, or with both, as they have been heretofore made, I cast the rims of such wheels, as well as in most instances the spokes and hubs, or naves, in one piece with the rims, of a composition of metal known to workmen under the name of hardened brass, or gun metal. It is not necessary for me to designate the proportions in which the respective metals are mixed which form the hardened brass or gun metal, as these will vary with the degree of hardness desired in the rim, or tread, of the wheel, in a manner well known to those conversant with the casting of brass and its compounds. Where it is desirable to increase the adhesion between the rail and the wheel, it may be found necessary to make the wheel proportionably softer, by decreasing the quantity of tin entering into the composition of them, or even to cast them of soft brass or of copper entirely.

I do not intend to confine myself to any particular form for the tread of the wheel, or for the spokes and hub; but to modify it in such way as experience may suggest to be the best adapted to the particular carriage or road to which the wheel is to be applied. I intend sometimes also, to cast the rim of the wheel of such metal without spokes, but furnished with such flanches, lodgements, or projections, as shall enable me to attach thereto, spokes of wood, iron, or other material.

My claim to an exclusive privilege I rest entirely upon a new manufacture of such wheels, by substituting for their rims, or for every part of them, a new material as hereinbefore set forth, the utility of which consists in its being better adapted to the purposes which they are intended to answer in running upon rail-roads.

MATTHIAS W. BALDWIN.

Specification of a patent for manufacturing Hose for Fire Engines, and for the Foundations of Machine Cards. Granted to SAMUEL D. BREED, *city of Philadelphia, June* 29, 1833.

To all whom it may concern, be it known, that I, Samuel D. Breed, of the city of Philadelphia, have invented a new and useful mode or method of manufacturing, from cloth, the hose used for fire engines, and for the conveyance of water or other fluids for various purposes; and also of so preparing the same material by a similar process, as to serve as a foundation for machine and other cards to be set with wire teeth; both of which articles have usually been made of leather. And I do hereby declare that the following is a full and exact description of my said invention.

The cloth employed for either of the above purposes is to consist of two or more thicknesses, saturated with, and cemented together by, a solution of caoutchouc, sometimes called gum elastic, or India

rubber. I dissolve the caoutchouc in rectified spirits of turpentine, naphtha, oil of sassafras, or any of the other menstrua in which that substance is soluble; to which solution I sometimes add resinous substances, or drying oils, should I deem such addition to be necessary; always depending however upon the properties possessed by caoutchouc, and allowing it to form the main body of the solution or varnish. When hose is to be made, I cut the cloth into strips, and wind it spirally round a cylinder of metal, wood, or any other suitable material of the proper size; saturating it either before or after it is wound with the prepared solution, or varnish. I cut the cloth of such a width as to allow it to lap over in winding, one or two inches, or any other desired distance, taking care in every successive winding so to lap as to break joints with the former. Any number of thicknesses of cloth necessary to give the strength required, may be thus used. For this, no rule can be given, as it will depend not only on the use to which the hose is to be put, but also upon the strength of the material itself. After this first saturation the varnish is allowed to dry, when another coating thereof may be given, and the hose be afterwards removed from the cylinder.

When I prepare the cloth to serve as a substitute for leather, in forming the foundation of cards, I in like manner saturate it with the before named varnish, cementing as many thicknesses together as the foundation may require. The cloth is then subjected to heavy pressure, until it is dry, or nearly so. When perfectly dried, the teeth are set in the usual way.

I do not claim to be the inventor of the above named varnish, or of the application of it to render cloth water proof; but what I do claim as my invention, is the manufacturing of hose, and of a foundation for cards, of cloth cemented together in two or more thicknesses, in the manner hereinbefore set forth, and thus employing it as a substitute for leather in the formation of these articles.

SAMUEL D. BREED.

Method of cleansing wool from its grease, and economising the residue.

M. Durcet, who has long been consulted by manufacturers, advised the following method, which was tried with complete success. Immerse the wool, well washed from dirt, in a vessel containing spirits of turpentine, and let it remain from thirty-six to forty-eight hours. Withdraw and immerse a fresh quantity. By means of a press, force out all the adhering spirit, spread the wool out to dry, and, when it is to be used, wash it in warm water containing a little alkali. When the spirits of turpentine will no longer act upon, or remove, the grease, distil it for fresh use, and the matter remaining in the still, treated with soda, will make good soap.

[*New Ed. Philos. Jour.*

¶ *Clay for Sculptors.*

Sculptors who prepare their models in clay, have frequently occasion to leave their work for a long time unfinished; and, in such cases, often experience much difficulty from the drying and shrinking of the material. It is well to know, that, by the addition of from ten to fifteen per cent. of muriate of lime, well worked or kneaded into this clay, it will be preserved for almost any length of time in a moist state, and fit for a renewal of a work without any preparation.

[*Ibid.*

Meteorological Observations for October, 1833.

Moon.	Days.	Therm. Sun rise.	Therm. 2 P.M.	Barometer. Sun rise.	Barometer. 2 P.M.	Wind. Direction.	Wind. Force.	Water fallen in rain.	State of the weather, and Remarks.
				Inches.	Inches.			Inches.	
☽	1	58°	62°	30.05	29.90	NE.	Brisk.	0.43	Cloudy—drizzle—rain.
	2	60	68	29.70	.70	SW.	do.	0.02	Rain—flying clouds.
	3	48	65	.90	.80	W.	do.		Clear day.
	4	46	60	30.04	30.04	W.	do.		Clear—flying clouds.
	5	39	64	.30	.00	W.	Moderate.		Clear—white frost—fly. cl'ds
	6	48	65	.30	.30	W.	do.		Clear—flying clouds.
	7	50	66	.10	.00	W.	do.		Cloudy—rain in night.
	8	62	69	29.70	29.60	W.	do.		Rain—flying clouds.
	9	54	67	.70	.80	W.	Blustering	2.08	Clear day.
	10	50	66	.90	.70	W.	Moderate.		Clear day.
	11	38	60	30.00	30.05	W.	do.		Clear day.
	12	44	54	29.90	29.64	W.	do.	3.00	Cl'dy.; rain in n't.; high wind.
	13	38	56	.60	.64	W.	Blustering		Cloudy—flying clouds.
	14	44	56	.83	.90	W. S.	do.		Clear day.
	15	45	65	.95	.75	S. SW.	Brisk.		Cloudy day.
	16	69	70	.75	.60	W.	do.	0.33	Cloudy—rain in the night.
	17	64	70	.70	.85	W.	do.		Cloudy—flying clouds.
	18	47	54	.70	.85	W.	do.		Clear—flying clouds.
	19	36	51	30.15	30.20	NE.	Moderate.		Clear—frosty—lightly cloudy
	20	39	43	.15	.10	NE.	do.	1.50	Rain.
☾	21	40	43	29.90	29.80	NE.	do.	1.20	Rain.
	22	44	44	.70	.70	W.	do.	0.11	Rain—cloudy.
	23	31	51	.80	.80	W.	Brisk.		Clear—frost—clear.
	24	38	59	.75	.60	W.	do.		Lightly cloudy—clear.
	25	29	61	.50	.50	W.	do.		Cloudy—hazy.
	26	42	53	.75	.60	W.	Blustering		Cloudy—flying clouds.
	27	39	56	.55	.60	W.	do.		Lightly cloudy—clouds.
	28	49	49	.60	.60	W.	do.		Cloudy—flying clouds.
	29	43	43	.70	.75	W.	do.		Clear—white frost: flying cl'ds
	30	38	44	30.00	30.00	W.	do.	0.01	Light fall of snow—clear.
	31	28	42	.90	.93	W.	do.		Clear day.
	Mean	44.06	56.68	29.85	29.83			9.24	

Thermometer.			Barometer.
Maximum height during the month,		70. on 16th & 17th.	30.30 on 5th.
Minimum	do. . .	26. on 31st.	29.50 on 25th.
Mean	do. . .	50.38 .	29.84

Note—Owing to the sickness of the observer, which was not communicated in time to supply his place, the record of the dew point is unavoidably omitted this month.—Com. Pub.

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